April 5, 1965

NOTES 4-5-65 BELEW

C-1 ENGINE: Phase II program planning meetings were held last week at STL and RMD.

J-2 ENGINE: A successful 473 second firing was accomplished on the S-IVB Battleship on March 31. The engine was operated at the maximum mixture ratio for 100 seconds of the run.

The engine for SA-201, with static test instrumentation added, was delivered April 4. The engine for SA-202 will be delivered a week later. Your note last week referenced Don Douglas' concern. We are aware of the concern of DAC; however, we, MSFC, should strive to keep the proper balance and not go through another RL10 situation.

The Incentive Contracting Plan, relative to J-2 Production Contract NAS8-5603, has not been returned to the Center. This plan was submitted to NASA Headquarters on March 10, and it is anticipated approval will be forwarded to this Center sometime this week.

I discussed the requirement for a vertical J-2 environmental (altitude and temperature) test stand with Sam Phillips during the two day meeting at KSC (March 26-27). His presentation to Dr. Mueller last week stated our position; however, Dr. Mueller rather firmly turned down the proposal to build the altitude stand. I understand a letter is on its way to you from General Phillips disapproving the stand. Any further push will have to come from the Center level.

F-1 ENGINE: Engine F-3014 (for S-IC-1) suffered a turbine inlet manifold failure during acceptance testing at RETS. The manifold material (Rene' 41) presents perpetual fabrication problems in obtaining quality parts. A material change to less exotic metals with lower ultimate strengths is precluded because it would require a complete structural redesign which the development and fabrication lead-time does not permit. The engine experienced some damage and an early appraisal indicates that repair can be easily accomplished. There was no facility damage and no vehicle impact is forecast.

H-1 ENGINE: The Directive has been received at MSFC for uprating the H-1 Rocket Engine to 208 $^{+4}_{-3}$ K thrust. A change has been issued to Rocketdyne for demonstration and qualification at the increased thrust level in support of Saturn IB Vehicle SA-206.

All eight gas generators which were removed from SA-8 have been disassembled, cleaned, and reinstalled on the vehicle with no schedule impact.

RL10 ENGINE: In reply to your question on March 8 regarding Centaur AC-5, the shaft of the butterfly prevalve has arms fixed 90° apart which activate micro switches when the valve is at the closed and open positions. The micro switches in turn operate lights in the block house for monitoring valve position. The open position micro switch also operates a solenoid valve which shuts off the pneumatic supply for the valve positioning piston. On AC-5 the light in the block house indicated that the valve was open and mechanically locked; however, there is a possibility that the micro switch was activated before the valve was locked due to misalignment of the switch. On AC-6 and subsequent the valve will be manually locked open one day before launch.

NOTES 4-5-65 CLINE

B 4/8

NEGATIVE REPORT

NOTES 4/5/65 CONSTAN

B 4/8

1. S-I/IB

Short duration (30 second) static firing of the S-IB-1 stage was performed on Thursday, April 1, 1965, at Huntsville, Alabama. Preliminary reports on the firing indicate that the test was satisfactory.

2. S-IC

The Boeing Saturn S-IC Manpower Cost Review team headed by Chris Andressen started the 10-day survey of The Boeing Cost-To-Completion study on March 31, 1965. A number of Michoud personnel are supporting this study team on a full time basis.

3. VISIT OF CONGRESSMAN JOE D. WAGGONNER, JR.

Congressman Joe D. Waggonner, Jr., Democrat, representing the 4th District (Shrevesport) and a member of the House Committee on Science and Astronautics visited Michoud for a tour and briefing on April 2. He was accompanied by Mr. Marshall Lynam, Congressional Assistant and Mr. William Sturdivant, Legislative Office, NASA Headquarters.

Tw 4/5

B 4/8

NOTES 4-5-65 DANNENBERG

1. Experiments Activity - Effort is underway to define which of the 84 AES experiments can be integrated into the IU or the S-IVB. The Experiments Coordination Office is working with P&VE and IBM on this effort which is due 4-15-65. ✓

2. Panel Review Board Secretariat Meeting 4-2-65 - In the meeting it was noted that General Phillips is addressing the Panel chairmen directly with instructions, not through the established MSF/Center channels and the PRB Secretariat. We are going to bring this question up in the next PRB meeting, scheduled for 5-4-65. ✓

Dr. Turnock has been named to the PRB by General Phillips. ✓

3. MSFC/KSC Working Relationships - A meeting of IO, R&DO, and KSC representatives was held at KSC on 3-30-65. Ad hoc groups were initiated to draft the following working agreements for signature by the Center Directors:

a. Program Control
b. Quality and Reliability Assurance
c. Logistics
d. Test Criteria, Plans and Catalogue
e. Configuration Management.

Tentative date for completion of final drafts is 5-3-65. ✓

4. Data Management - Documents Requirements List and Document Requirement Descriptions have been prepared for Discrete Control Equipment and ESE and will become contractual. There have been 128 Center Apollo Document Description Standards (CADDS) prepared which can be used as standards for documentation requirements for MSFC. ✓

5. ICD Operations - The Configuration Management Office reversed their verbal agreement of 3-2-65 to establish Required Release Dates. Efforts to get IO Panel representatives to establish Required Release Dates was fruitless. R&DO chairman therefore established same. Procedures for implementing ICD Operations consistent with intent of NPC 500-1 are being considered for preliminary discussion with the Apollo Project Office Headquarters (APOH) and other Center representatives on 4-8-65, at KSC.

1.0.
FYI
B

Fw 4/5

B 4/8

NOTES 4/5'65 FORTUNE

1. Labor and Community Relations continue strained - Tyvoll along with Corps of Engineers Monegue averted two strikes and persuaded the local Business Agent to call Pipefitters back to work when they walked off a job after two were fired for not working. The Missile Sites Labor Commission will meet today to consider whether an operating engineer must stand by to operate an overhead crane in the High Pressure Industrial Water Pumping Station or Pipefitters, Electricians and other crafts can use it as a tool of the trades. State Highway and Motor Vehicle Departments are insisting we must assume title and maintenance of Highway 43 in the Fee Area or they must fine all trucks carrying overloads along it. We have agreed that it was the Corps of Engineers problem to begin with and they should act for both agencies. It was time they met with the State regarding diverting traffic from Highway 43 on to Road "A", which will occur shortly. The Hancock County Board of Supervisors is threatening to withdraw support from the Regional Planning Council and Mosquite Control unless we protect their property in the Buffer Zone and hire their Security Patrolmen who have just been displaced by Harrison Detectives, Inc., who won sub-contract competition for permanent security force. Will take this up with Gorman. ✓

Doesn't look so good, eh? B

2. Test Stand A-2 - The first cut of the end to end data for Test Stand A-2 & supporting systems will be fed into computers today 4-5-65. A complete program review covering all Facilities/Systems Activities necessary to conduct a hot firing of Test Stand A-2 is scheduled for 4-10-65 at MTF. ✓

NOTES 4/5/65 GEISSLER

1. Saturn IB and V Design Trajectories: Current IB and V design trajectories, based on specification weights, were established in early 1963. Design trajectory revisions are now necessary due to specification weight revisions, mission and payload commitments changes, and performance improvements. Accordingly we have started an extensive study to develop a new set of trajectories for structural and thermal design, and mission analyses. Differences in the old and new trajectories are anticipated, and design impact must be evaluated. We believe design trajectory envelopes should be sufficiently conservative to allow some flight mechanical and mission flexibility for performance improvements, e.g. lifting trajectories, elliptical parking orbits in conjunction with Apollo orbit and lunar missions, etc. Urgent need for revised trajectories has been expressed by stage contractors, MSC, and inhouse personnel to assure stage to stage and vehicle to spacecraft design compatibility. To produce these trajectories on a timely basis will impose an extensive workload on Aero and P&VE. Meeting will be held with P&VE to discuss the problem. A delay in other lesser priority work in Aero may be caused due to urgency of this effort and manpower limitations.

2. Saturn IB Ground Wind Wind Tunnel Tests: In the Langley Transonic Dynamic tunnel on April 1, 1965, our IB model failed (escape rocket broke off). It failed due to dynamic oscillations at full scale wind speed of 33 knots. This represents about a 91% probability level of ground winds at the Cape. A slight delay (1 - 2 days) may be incurred while model is being repaired. At 33 knots 90% of the design bending moment was obtained. Test program should be completed before decision of need for full scale tests at Cape can be made.

3. Saturn IB Dynamic Test Vehicle: A structural failure has occurred in one of the circumferential beams of the upper spider beam of the Saturn IB dynamic test vehicle. The failure was in the form of a large crack starting at the junction of web and flange at one end of the beam and extending a foot or so into and along the web. The cause of the failure is unknown as is the time at which it occurred; discovery was made Sunday, March 27, just after completion of the SA-202 dynamic tests. The damaged portion of the beam has been removed and a new piece installed. It will be necessary to repeat a few test conditions to determine the effects of the damage. This will cause a one-week time loss in the test program and severely limit the remaining tests. Loose bolts also were found in the connection of the first and second stages of the Saturn IB dynamic test vehicle. Because of this and the beam failure, Quality Laboratory was asked to inspect the vehicle, particularly the stage interfaces, for bolt tightness. The vehicle is now in satisfactory condition, and tests have been resumed.

Iw 4/5

NOTES 4-5-65 GRAU

B 4/8

I Iw

1. S-IU-10 CHECKOUT: Checkout of the S-IU-10 Instrument Unit has been completed and the Unit is being released to Manufacturing Engineering Laboratory ~~today~~, April 5, 1965. ✓

2. S-1C BOEING-WICHITA ACTIVITY: A separate production facility for "Bluestreak" Orders (hot orders to be delivered in ten days or less) has been established at Boeing-Wichita Plant I. The Quality Control system was reviewed and found adequate, and a Material Review Board has been established and staffed for the activity. A Boeing, Wichita, Management reorganization has been announced which transferred the former Director of Quality Control (Mr. Blue) to the position of Assistant Manager of Manufacturing. Other changes in Boeing's quality organization are anticipated but not yet announced. ✓

3. F-1 ENGINE PROGRAM: F-1 engine 3012 was received March 22, 1965. Mechanical systems checkout to date has revealed only minor discrepancies. This is the first flight engine assigned to S-1C-1 and the first block 3 engine received. ✓

4. S-IVB PROGRAM: Post manufacturing checkout of S-IVB 201 was concluded March 29, 1965 in order to begin the block II modification program. Checkout was not more than 20 - 25% complete and block II modification will invalidate some of the checkout thus far accomplished. It is presently planned that about 5600 manufacturing hours on the 201 stage will be transferred to Sacramento. The Checkout Working Group will meet to determine what action can be taken at Sacramento to assure an adequate test program for the vehicle. ✓

5. S-1C QUALIFICATION TESTING: Boeing recently presented MSFC a proposed contract modification for qualification testing at a cost of about $23 million. If bought by NASA, the proposed testing will update the effort so that all hardware will be qualified for manned flight for vehicle number 7. An additional modification would be necessary if it was decided to start manned flight with vehicle number 4. Another meeting with Boeing on this subject is planned for early May. 5

D.G.

Dr. Mueller insists of having 504 "manrable". Please take up the additional funding requirements with Jean Phillips IO B

fw 4/5

NOTES 4/5/65 HAEUSSERMANN

B 4/8

1. WEEKLY REPORT FROM IBM, OWEGO: The specific cause of solder connection cracks on the Digital Computer Unit Logic Devices has not yet been determined. The clip shear torque does not seem to be the primary cause of the fracture. (Reference your comments on Weekly Notes of 3/22, Copy Attached*) However, one significant operation, which may have been over-stressing the ULD's, has been modified. The units were previously "burned in" at a temperature of 150° C. for 500 hours. This time is being reduced to 168 hours for an interim period to permit further evaluation. Experience has shown that most of the units which are screened by the burn-in test fail in the first 168 hours. The reduced burn-in time will increase the early availability of ULD's for computer build-up in addition to reducing the exposure to an overstress condition. After further evaluation of available data, the burn-in operation may be eliminated completely or another burn-in period selected.

2. HUMAN RESOURCES STUDY: We delivered our Human Resources Study on time to Mr. Cook, Friday, 4:20 p.m.

* Copies to DIR and R-DIR only.

NOTES 4/5/65 HEIMBURG B 4/8

1. F-1 ENGINE:

Preparations have begun on the Static Test Tower West to install S-IC suction line brackets. This will require that testing be discontinued until early May 1965.

2. S-IC:

Engine attachment (5 engines) was completed on Tuesday, 3/30/65. Engine interface connection and initial system sequence checks were made on Saturday, 4/3/65.

3. S-IVB:

The S-IVB Battleship underwent a satisfactory 472-second test on 3/31/65. The next test is scheduled for 4/6/65.

4. S-II:

The S-II Battleship countdown review was held with S&ID on 4/2/65, where a 99% probability of no failure was given. A 7 to 10 day schedule slip is evident with a 4/22/65, target date given for the first 5-engine ignition test.

5. S-II-T MTF:

S-II-T at MTF, an exercise to review the S-II facility activation schedule has been initiated with a 4/12/65, completion date and presentation.

Fw 4/5

B 4/8

NOTES 4-5-65 HOELZER

1. INTEGRATED DATA PROCESSING SYSTEM FOR PR, FMO, AND TSO: The Task Group for developing an integrated data processing system to combine Purchasing, Financial Management, and Technical Services Office applications in the procurement cycle, met this week. The Group studied a Financial Management Office request that the ADPS work on the FMO 1401 computer be reprogrammed to a larger 1410 computer. The effect of such a reprogramming effort on the main goal, which is to develop an integrated system, will require careful management considerations. ✓

2. OVERTIME IN SUPPORT OF ROSE STUDY: One General Electric support contractor unit has expended 290 hours of paid overtime in support of the Personnel Office to develop computer systems for the Rose survey data. This has all been since March 11, 1965. The Chief of the Personnel Office has stated that without the computer help the amount of data that has been manipulated would have taken so long that it would not have been possible to support the survey. Historical data was collected dating back to July 1, 1963. ✓

3. SINGLE-SUPPORT CONTRACTOR COMPUTING SERVICES: In keeping with the intent of the policy established in your memorandum of August 26, 1964, entitled: "Policy for Computer Programming", Computation Laboratory has been and is continuing to analyze the computing services required by the various Single Support Contractors in the fulfillment of their scopes of work. The first action resulting from these studies has been a decision to provide computing services required to be rendered by Brown Engineering Company in support of Propulsion and Vehicle Engineering Laboratory. Accordingly, Brown has been notified through the Purchasing Office that on the effective date of their contract computing services will be provided by the Government. ✓

NOTES 4/5/65 JAMES

PEGASUS: As you are probably aware, a number of Pegasus A panels have failed and 22 groups (154 capacitors) are inoperative. Testing was started at Republic Aviation on 3/29 to temperature cycle a group of panels to duplicate failures on Pegasus A, then analyze failures in the materials laboratory at MSFC. One panel failed at high temperature in 6 cycles. This panel is now at P&VE for analysis. Some statistical analysis has been performed that shows the shorting occurs at temperatures in 180°F region and in logic groups that exhibit a lower composite insulation resistance at 250°C.

CISLUNAR PEGASUS PDP: Reference your comment on my 3/15/65 Notes. The Dry Run of the Cislunar Pegasus PDP is now scheduled for 4/6, 10th Floor Conference Room. The Mueller briefing will be 4/15 in Washington.

S-IB-1 SHORT DURATION FIRING: The first cluster firing of 200K engines was successfully accomplished 4/1 for a duration of approximately 32 seconds. Quick look data indicated all engines operated within spec and the propulsion system operated satisfactorily.

H-1 ENGINE UPRATING: I was informed by Headquarters 3/31 that General Phillips approved our plan to uprate H-1 engine to 205K, as a minimum, with possibility of going to 210K providing the engine could achieve this and providing no major structural changes are required.

S-IVB BATTLESHIP: Full duration firing with closed loop propellant utilization system and high mixture ratio was completed 3/31 as scheduled. Excellent results were achieved. A closed loop, low mixture ratio firing is tentatively scheduled for 4/6.

FACILITY CHECKOUT VEHICLE: Preparations are continuing for initial facility checkout vehicle propellant loading test scheduled for 4/16. Stage electrical power hookup has been completed. Bulkhead vacuum decay tests, hardware instrumentation checkout, and P. U. subsystem calibration will start next week. DAC reports they are currently 1 week behind schedule and have initiated a recovery plan with which they expect to maintain the 4/16 date.

IBM EFFORT AT KSC: Proposed statement of work for IBM activities at KSC was received from KSC 3/30. Distribution has been made within MSFC and an inhouse MSFC meeting is scheduled for 4/6 with MSFC/KSC meeting scheduled for 4/7. A brief look at the statement of work indicates IBM activities at KSC may be too broadly stated.

MSC LH_2 EXPERIMENT: (MRAZEK) A TWX has been sent to MSC informing them that MSFC can accommodate Suborbital Cryogenic Storage Zero "g" Experiment on SA-203 with no schedule slippage providing experiment package is delivered to KSC by 1/31/66. Additional costs will be $5,000. MSC must now present this to the Headquarters Experiments Review Board.

Attachment #1: Notes 3/15/65 James to Dr. von Braun only.

NOTES 4-5-65 Koelle

1. Advanced Studies during the Month of February: The evaluation of manpower charges within MSFC resulted in the following breakdown:

a. By organization:

	Direct	Indirect	Total	Percent
Future Projects Office	21.7	10.1	31.8	15.4
Research Projects Laboratory	14.3	5.8	20.1	9.8
Manufacturing Engineering Laboratory	1.1	0.3	1.4	0.7
Astrionics Laboratory	8.7	3.4	12.1	5.9
P&VE Laboratory	61.1	24.2	85.3	40.4
Quality Reliability & Assurance Lab.	0.2	0.1	0.3	0.1
Computation Laboratory	2.3	4.1	6.4	3.1
Aero-Astrodynamics Laboratory	35.2	12.3	47.5	23.0
Test Laboratory	0.8	0.3	1.1	0.5
	145	61	206	100

MSFC SHARE: 206/7,850 = 2.56% without Center Burden

With Burden ≈ 3% TOTAL

b. By activity area:

124-06	Advanced Nuclear Systems	15.2
127-06	Advanced Concepts, Human Factors	0.4
981-10	Advanced Orbital Studies	9.2
981-20	Advanced Lunar Studies	48.7
981-30	Advanced Planetary Studies	13.3
981-40	Advanced Launch Vehicle Studies	52.5
981-60	Supporting Studies	5.0
981-89	Project Management	0.4
	TOTAL, Adv. Studies (direct charges)	145 Manyears

NOTES 4-5-65 KUERS

1. Excessive Administrative Work Load: Hereby, I want to join the chorus of voices complaining about excessive administrative work load. All key personnel of ME Laboratory are spending an unjustifiable percentage of their time for administrative work such as overtime control and records (which nobody ever reads), Tabaka study, manpower resources study, systems engineering matrix study, justifications and re-justifications (three or four times) of any decision or action taken. In addition, we are swamped with regulations and instructions such as NPC 200-1,2,3,4, (I do not know how many dash numbers we have today); NPC 500-1 thru 10, etc., and their implementations from all kinds of offices and levels of our organization. We are supposed to read all this and even act according to these rules. The trend is replace responsibility and authority of key personnel by rules, regulations, number games, and matrixes!

2. Modular Tooling Concept Development: First demonstration of a modular electro-optically guided welding system took place last Friday in the presence of Mr. Norman Mayer, Chief, Advanced Structures and Materials, OART.

This most advanced equipment was developed for ME Laboratory by Cayuga Company and Dr. von Voros of Stevens Institute of Technology in Hoboken, New Jersey, over the last 2- 1/2 years as a sub-program to the experimental tank configuration programs in order to overcome the huge stationary tooling requirements for larger vehicles by a modular or local multipurpose concept.

The new welding skate follows the weld seam of nearly any three-dimensional geometry without pre-programing by means of five sets of photocell sensors and keeping the many variables of welding within required relation. It works like a welder with five eyes, no human deficiencies in precision and repeatability of motions.

This equipment will now go into further evaluation by ME Laboratory with the goal of providing for a larger degree of freedom in design of advanced vehicle structures.

NOTES 4/5/65 MAUS

B4L9

1. PROGRAM OPERATING PLAN (POP) 65-2 - The Manned Space Flight guidelines for R&D and CofF Program Operating Plan 65-2 were received April 1, and are being disseminated within Marshall. Guidelines for Administrative Operations are expected to be received separately in the near future. The Center's Program Operating Plans for R&D and AO are due in Headquarters (MSF) by May 7; CofF is due May 10.

2. INSTITUTIONAL PRESENTATION FOR THE APRIL MSF MANAGEMENT COUNCIL MEETING - The institutional presentation for the MSF Management Council Meeting will be given by Mr. Gorman. Emphasis will be on MTO activation, including: MSFC-MTO organization, Land Management Policy, Community Impact, Labor Relations, and Facility Construction Status. Programmatic Aspects of the MTO Activation will be covered in Dr. Rudolph's presentation.

3. HUMAN RESOURCES SURVEY - Keith Wible furnished a package of recent letters between Dr . Seamans, Mr. Webb, and the Bureau of the Budget, which give considerable insight into the fundamental reasonings behind the current Human Resources Survey:

   a. The current data which Marshall and the other Centers are developing is required by BOB before they will re-open average grade/average salary negotiations with Mr. Webb.

   b. BOB will allow increases in average salary to cover within grade promotions (step increases) only if NASA can show that the step increases are not off-set by average salary decreases resulting from quits.

   c. BOB will allow NASA increases in average grade and average salaries for GS-16 positions approved by the Civil Service Commission.

   d. Actions to achieve the objectives and ceilings established by BOB are not to include demotions, reductions in force, or other actions affecting incumbents without prior ceiling review and approval by the BOB.

fw 4/5

B 4/9

NOTES 4-5-65 McCARTNEY

1. SINGLE SUPPORT CONTRACTS: The balance of the NASA Headquarters approvals on the single support contracts were received last week. The transition to the new single support contracts is in various stages of completion, with Test Laboratory being the first to have a complete transition. The program at ME and AERO is progressing on a planned basis without difficulty. Difficulties of various order and magnitude are being experienced at P&VE, ASTR and QUAL. With the action being taken by Center Management, this week, the problem of the incoming contractor recruiting contractor personnel should be materially reduced. Negotiations with Brown Engineering Company for RPL have been completed, and the contract should be presented to Center Management for approval next week. Col. Fellows, Chairman of the Single Support Contract Performance Evaluation Board is well along in the program of establishing the Incentive Award plan for each laboratory and office involved.

Hosen. Geidner
Ed O'Connor

Let's discuss that next staff luncheon
B

2. SPACE TRANSFERS: Discussions with Messrs. Maus and Hueter are being held concerning the schedule of space transfers from R&D Operations to IO. The R&D Operations view is that a moratorium should be established for the next 3 or 4 months, pending review and analysis of the Rose Study and the working of those Administrative Procedures established to assist in freeing up of spaces through tightening-of-belt procedures. The moratorium would allow R&D Operations to supplement the current attrition rate to meet our commitment to IO for a total of 240 spaces. At the present, IO has approximately 190 vacancies; R&D Operations is overstrength because attrition is not freeing up spaces necessary to meet the previously planned transfer. It does not make sense to transfer further spaces with IO having unfilled vacancies and R&D Operations being overstrength. That condition precludes recruitment to fill losses in essential technical and administrative support categories, except through special consideration by Personnel Office.

3. R-RM ACTIONS: We are currently engaged in the following major actions: PEP 65-2, Year-End Initiations, Human Resources Study, PREP, and IO/R&D Operations Workload Agreements. We are also carrying out implementation of various items contained in the R&D Operations/IO guidelines. These actions are all now in progress. Since these are projects requiring extensive participation, they have not yet reached completion points. However, the various efforts are progressing satisfactorily and no major problems have been encountered. I will advise you as to significant developments after these actions have further matured.

Tue 4/5

B 4/9

NOTES 4/5/65 RUDOLPH

1. Saturn V Program Control Center - As you are aware we are in the process of constructing a Saturn V Program Control Center on the 3rd floor of Bldg. 4201. This center will give the Saturn V Stage Project Managers and myself much needed program visibility. ✓

It is expected that this control center facility will be fully operational on or about May 15, 1965, at which time I will extend to you an invitation to visit this facility. ✓

Frank. Let's discuss this next Staff & Board Meeting B

2. Meetings on Monday and Friday - The January 18, 1963, Center Board Meeting minutes indicated that Monday and Friday of each week will be set aside during which no meetings will be held requiring the presence of Dr. von Braun or Division Directors. This policy decision to my knowledge has not been rescinded and I would assume its enforcement today would also preclude meetings requiring attendance of DIR R&DO, DIR IO, and Program Managers. It is recognized that enforcement of such a policy is difficult, however, I feel we must make every effort to adhere to this Policy.

Colonel O'Connor has set aside Monday mornings for his IO Staff Meeting and I have scheduled my Saturn V Staff Meeting for Monday afternoons. Since more and more Center meetings are being scheduled which conflict with the established Policy, I suggest a re-statement of this Policy and sincere efforts by all to comply.

3. S-IC Dynamic Stage (S-IC-D) - The S-IC-D configuration will be reduced to meet minimum requirements to perform vehicle objectives. This should enhance Boeing's capability to deliver this stage on schedule. ✓

4. S-II Dynamic Stage (S-II-S/D) - Through recent coordination between S-II Stage Project Office personnel and Dynamic Test Vehicle personnel, the requirements for the S-II-S/D Stage have been agreed to with the exception of a number of Ballast Items and Flight Type Vent Systems. A waiver may be required on these items to insure a November 15, 1965, delivery of this vehicle to MSFC. ✓

5. Instrument Unit Mission Contract with IBM - We have been informed that Headquarters has approved the IBM Mission Contract including the supporting facility contracts.

Tw 4/5

B 4/9

NOTES-4-5-65-SHEPHERD

No Notes

NOTES 4-5-65 Stuhlinger

B & G

fwd 4/5

1. PEGASUS A: Further analysis of the failure of detector panels revealed a strong correlation with the temperature history of the panels. This fact implies that detector failures (electric shorts) can probably be avoided if the detector temperature is kept lower. Consequently, a change in the thermal control surface (application of white paint) has been recommended to Pegasus Project Office for Pegasus B and C. Except for this detector failure problem, Pegasus A continues to work properly. ✓

2. PEGASUS PRESENTATION TO DR. SEAMANS: Milton Ames will give a Pegasus Status Report to Dr. Seamans on April 12. Material for this report will be prepared jointly by Pegasus Project Office (Dr. Johnson) and Pegasus Evaluation Group (Dr. Dozier). ✓

3. MSFC SUPPORTING RESEARCH & TECHNOLOGY PROGRAM: By March 31, the total amount of "authorized" research funds from the four Headquarters Program Offices had climbed to $32,525,000 - due to some year-end increases. Of this amount, $31,280,193 - has been processed to FMO. It is expected that more FY 1965 funds will be authorized during the next weeks. The various staff offices at MSFC involved in the procurement cycle promised their assistance in the obligation of these belatedly authorized funds. ✓

4. RESEARCH ACHIEVEMENTS REVIEW: Our recent research achievements review (March 25) on Cryogenic Technology and Solid and Liquid Propulsion Technology was attended by 110 members from MSFC, Headquarters, other Centers, and the Air Force. An exhibit of models and components supported the presentations. The speakers, and most of the work described, were from P&VE. In my opinion, the review was very good. Unfortunately, none of the members of Laboratory and Center top management could find time to attend. ✓

E.S., We have a repeat show, don't we? B

5. KURZWEG VISIT: Dr. Kurzweg, after his two-day visit at MSFC, was very complimentary of the inhouse research achievements described to him, particularly of that work which "helps to replenish our badly exhausted store of fundamental knowledge in the space flight sciences". He expressed his hope that MSFC top management will permit as much as 1% of the total MSFC effort to be spent on inhouse research in the space flight sciences, particularly mathematics, celestial mechanics, materials, thermophysics and radiation physics. ✓

6. SUMMER PROFESSORS: During the past week Dr. Shelton, Dr. Head and Dr. Vachon selected fifteen professors for summer work at MSFC from a large number that had offered their services. ✓

P.S. from Bonnie. Yes, the "repeat" meeting is scheduled for 4/19/65, 9-12.

April 12, 1965

Toller to Maus Central file

NOTES 4/12/65 MAUS

1. HUMAN RESOURCES SURVEY - Data from the laboratories, program offices, and staff offices has been submitted to the central coordinators and is to be delivered to Mr. Newby's Working Group today; analysis and compilation of the final report can begin immediately.

   General Bogart has requested that MSF review the data with the Centers prior to submission to Dr. Seamans' staff. We have proposed April 26 as the date for this review.

2. MANPOWER - MSFC's 185 summer student spaces, which are effective July 1, 1965, have been vouchered as follows:

19	Industrial Operations
15	Staff Offices
131	Research and Development Operations
20	Personnel Office for revouchering to elements, for special category summer employees.

   On the more important matter of permanent personnel complement, we received another inquiry last week from headquarters concerning withdrawal of MSFC's vacant spaces that have existed for some time. We countered with an explanation of our need to hire GS-4's and below, which also aids in reducing our average salary figure. As of April 2, R&DO was 11 understrength; IO was 68 understrength; and Staff was 33 understrength. Counting temporaries, co-ops, consultants, and permanents, the Center has 7,613 filled spaces compared to a ceiling of 7,658.

3. APOLLO COST STUDY - Prime Saturn IB, Saturn V, and Engine contractors have delivered the data initially requested of them, to the Director of the Launch Vehicle Study Team, and to MSFC. MSFC cost estimates for other than prime contracts (for the current programs) have also been delivered. Still to be submitted are:

   - estimates of cost to attain production rates contemplated by the AES Study Team, but which are beyond rates to be reached in the current program.
   - estimates of cost for launch operations support for the current program, from Saturn IB and Saturn V prime contractors.

   This study has been fraught with inadequate planning, confusion, and wasted effort which have resulted from the fragmented approach employed by the Apollo Cost Study Team. We have pointed this out to the headquarters leaders of the exercise, but it has been of little benefit in our efforts to minimize workload imposed on the Program Managers. The confusion has been somewhat compounded by the separate but very valid requests from the AES Study Team. These requests could have been integrated by the Apollo Cost Study Team, if there had been better direction by headquarters and better understanding of the workload on field centers and contractors.

4. AES STATUS - Attached is a summary report on status of AES activity.

15. note

NOTES 4-12-65 BELEW

B 4/15

J-2 ENGINE

The engine for SA-202 will be delivered to DAC April 13, 1965 with modification kits installed.

II fw The duration firing on the S-IVB Battleship April 7, 1965, was terminated after 43 seconds by a chart observer when the stage fuel inlet pressure exceeded its redline. The engine was operating at the minimum mixture ratio at cutoff.

A second flight configuration R&D engine has completed 25 starts and 5000 seconds of test time.

We plan an informal presentation to Dr. Mueller during his visit on the need for a vertical J-2 environmental test stand. We (Mr. Drummond) will present the overall program pitch and P&VE (Hans Paul's People) will speak on the technical justifications for the stand.

RL10 ENGINE

A successful simulated Centaur relight test was conducted on the P&W's E-5 Test Stand on April 8, using the redesigned Centaur boost pump recirculation lines.

The delivery of Centaur AC-6 to Cape Kennedy has been rescheduled to May 15. The completion of the 36 B launch facility is proceeding on an expedited basis, with completion estimated in August 1965.

H-1 ENGINE

I fw H-1 Engine 200K Qualification Testing was completed on April 7, 1965.

All H-1 Engines performed satisfactorily during the first 200K cluster firing on S-IB-1.

F-1 ENGINE

R&D engine 024 has accumulated 3138 seconds of operation in 23 starts. Model Specification life for Qualification engine is 2250 seconds.

The Guppy (carrying engine F-3013, an S-IC-501 flight engine) was grounded for fuel tank repairs at El Paso, Texas, from April 5 to April 9, 1965. Receipt of F-3013 at MSFC was delayed four to five days which may have an impact on Qual and ME Lab schedules.

S-IVB ULLAGE ENGINE - ROCKETDYNE/GEMINI

The high temperature (150°F) hot firing phase of the MSFC Qual program was successfully completed April 8, 1965. The test was conducted on MSFC Qual engine number two.

GENERAL

Vice President Humphrey visited Edwards Air Force Base on April 1, 1965, but had not planned to visit the Rocket Engine Test Site nor did he do so. He apparently received briefings, etc. on the B-70 program.

Tw 4/12

NOTES 4-12-65 CLINE

B 4/15

NEGATIVE REPORT

fw 4/12

NOTES 4/12/65 CONSTAN

Negative Report

B 4/15

Fw 4/12

B 4/15

NOTES 4-12-65 DANNENBERG

1. Dr. Mueller's Visit on April 16-17, 1965 - While it is recognized that Dr. Mueller is interested in "subsystem managers" (along the MSC pattern) we will present to him the type of R&DO support to IO as it now exists for his visit. This support is primarily by the laboratory project engineers with technical backup by the divisions. ✓

2. Certificate of Flight Worthiness - Implementation of "Certificate of Flight Worthiness" is meeting some reluctance on the part of the stage offices and our laboratories. Action is being taken to establish the reasons for this lack of interest. ✓

3. Pre-Launch Assessment of IB/V Launch Vehicles - Col. Russell, MAO, has proposed that MSFC and MSF review completely the documented history of each vehicle three weeks prior to launch. ✓

4. Alternate Flight Missions - R-AERO has been requested to compile the work which provides flight mission options if certain vehicle failures occur. You will be briefed on the results in late April 1965. ✓

5. AES Experiment Study - The 84 manned AES experiments defined by Headquarters are being analyzed by the Experiments Coordination Office and IBM to determine which ones could be carried in the S-IVB or IU. Based on preliminary guidelines, manned experiments on the L/V will require extensive extra-vehicular activity. This in turn requires identical orbits for S/C and L/V. Such will be available for V but not for IB if SM propulsion is used (as presently considered) for 200 n. m. circular orbit. Deadline April 15. ✓

6. Ground Abort - 201/2 - The TWX from Gen. Phillips formalizing the decision on ground commanded engine cutoff was in error by assuming that circuitry to initiate abort and L/V engine cutoff by ground command to spacecraft is already implemented. This circuitry is presently not available in the launch vehicle although it can be implemented. ✓

7. Crew Safety Panel Meeting was held at DAC and NAA in Los Angeles on April 6 and 7. The situation over the pad at liftoff will require an angular rate limit setting which will be exceeded later in nominal flight. Switchable rate gyros are required and will be developed in parallel with the single limit rate package. Adequacy of LES for escape from overpressures from explosions is being reevaluated by MSC. ✓

fw 4/12

NOTES 4/12/65 FORTUNE B 4/15

1. Labor Relations Improve - We got through this week with no strikes, only a few talks being required. Thursday, New Orleans Construction Interest pointed out to Corps and MSFC Representatives where we might be better off going on shift work instead of overtime for S-II Test Stand catchup. ✓

2. Hancock County Supervisors greedy - The Board of Supervisors made plain to us Friday that they wanted some share of the money being spent here and jobs for the nine men previously employed on the security patrol. We had hoped to establish a small county patrol to protect the governments interests and the buffer zone, per discussion with Gorman, but apparently must exercise more persuation to get costs to a justifiable level. ✓

Who wouldn't ?! B

3. Corps of Engineers request we feed construction workers - After repeated troubles with their former concessionaire O'bannon and later our mobile canteen operator, Findley, L. Col. Beatty wrote MTO asking that GE's sub-contractor, Southern Cafeteria extend its services to the construction sites. Southern did fine job, also getting compliments from the workers for better quality food. ✓

4. MTF Planning Board holds review of Activation Progress - Saturday, Dr. Rees, Col. O'Connor, Col. Yarchin and a plane load of other MSFC personnel joined us at MTO in determining how to meet the S-II Rephased Program and establishing means by which IO can receive timely analysis of progress, problems and integrated reports by all elements involved in Activation and Operation. ✓

NOTES 4-12-65 GRAU

1. S-IVB PROGRAM: There is a life cycle problem on the J-2 Engine for the S-IVB Program with respect to the gimbal and propellant inlet ducts. The DAC hydraulic fill and drain procedures cause the propellant duct cycle life to be greatly exceeded. Action is being taken to prevent over-cycling of these critical components. This action will undoubtedly affect and modify the system test and checkout procedures for the S-IVB stages. Rocketdyne is aware of the problem and is attempting to find a solution.

2. PEGASUS PROGRAM: Acceptance testing of the PEGASUS B under environmental conditions is scheduled for accomplishment at GE this week, with shipment to Kennedy Space Center to follow immediately. In-flight burn-out capability for possible shorts in micrometeroid detectors has been provided. Extensive testing of detector panels under various environmental conditions is being conducted both in this Laboratory and at contractor facilities.

3. PARKER AIRCRAFT COMPANY QUALITY SURVEY: A quality survey of Parker Aircraft Company, Los Angeles, California, was conducted for the main part, to investigate the adequacy of the actions taken by Parker to correct the causes of discrepancies encountered in recent failures of the 6" ball valves at CCSD, Michoud. The survey revealed no deficiencies in Parker's quality system to the requirements of CCSD-Q-502 (CCSD'S equivalent to NPC 200-2) and that Parker is taking sufficient corrective action to preclude these discrepancies from recurring.

4. HAYES INTERNATIONAL CORPORATION QUALITY SURVEY: A joint MSFC-KSC survey of the quality assurance system of Hayes International Corporation, Birmingham, Alabama, was performed. The contractor's system was found to be capable of meeting the requirements of NPC 200-3 as well as other contractual quality requirements. Minor discrepancies were noted and called to the attention of contractor personnel for correction.

5. MTO QUALITY ACTIVITY: Delegation of quality assurance functions at MTO was made last week to the Atlanta Air Force Contract Management District in accordance with NPC 200-1A. It is estimated that 44 Air Force personnel will be required during the activation phase. Due to known difficulty in obtaining DOD manpower, a teletype was sent to General Bogart at OMSF, requesting that his office work with Air Force Systems Command Headquarters to expedite obtaining personnel spaces and people with missile site activation experience. Lt. Col. Greenhorn of General Bogart's Office has advised that the teletype has been received and action is being taken. He will keep us advised of developments.

Fw 4/12

NOTES 4/12/65 HAEUSSERMANN B 4/15

1. LAUNCH VEHICLE DIGITAL COMPUTER-DATA ADAPTER STATUS: The most likely cause of the condition which made the Unit Logic Device S-clips susceptible to fracture has been determined. The connecting lands onto which the S-clips are joined is not adhering properly on a consistent basis to the ceramic substrate. A process change which involves a slow drying of the conducting paste at ambient temperature, rather than the previous rapid-dry at elevated temperatures, has been instituted. A change in the paste material to provide further improved adherence is being investigated. A redesign of the S-clip to afford a better solder connection and to prevent transmission of forces to the connecting land during shearing operations and other handling is also being investigated. Present planning is to incorporate the improved ULD in Production System No. 1, which is scheduled for delivery on 7/30. If a detailed analysis which is presently under way shows that the reliability of the prototype systems has been seriously degraded by the incorporation of the suspect ULD's, a recommendation will be made to fly Production System No. 1 on SA-201.

2. RADAR ALTIMETER: We decided to completely eliminate the radar altimeter from the Saturn Apollo Program. Consequently steps have been taken to cancel the radar altimeter from all Saturn IB and V flights. SA-8 and SA-10, however, will carry the altimeter as planned in an effort to complete its development phase with flight test data.

3. AZUSA-MISTRAM: MSF's direction to allocate only one but not both systems for Saturn test flights started an evaluation of both systems relative to their merits for the Saturn program. The following items have been taken into consideration: hardware status, vehicle borne and ground, reliability, workmanship, availability now and in the future, involvement of Astrionics Laboratory manpower, checkout requirements and procedures, economics, and systems capability to satisfy MSFC's range safety and data requirements. As a result, a laboratory recommendation to R-DIR, copies to other offices concerned, has been formulated to select the Azusa system now (MSF had agreed to a decision on 7/1/65) and approve the following plan: Azusa and Mistram in 201 and 202, all the follow-on Saturn IB flights will carry Azusa only, all Saturn V flights will carry Azusa only. Approval by 4/19/65 is required to take necessary steps for procurement and updating of Azusa transponders and for possible exchange of Mistram transponders on hand for Azusa transponders then required.

I.O. Please take up with Sam Phillips Office B

NOTES 4/12/65 HEIMBURG

1. S-IC:

Test No. S-IC-01 was conducted on 4/9/65, at 4:20 p.m. Test was unintentionally terminated by operations personnel at approximately 40% thrust. Test No. S-IC-02 was made the same date at 6:45 p.m. The test ran for approximately 2.55 seconds and automatically terminated by a safety circuit. The cause was a broken wire in a cannon connector found on post-test inspection. Test No. S-IC-03 was performed on 4/10/65, at 5:10 p.m. The scheduled duration of 15 seconds mainstage was attained with no stage or engine hardware damage.

2. S-IVB BATTLESHIP:

On 4/7/65, a full duration firing was attempted by DAC at Sacramento, but was aborted after 42 seconds by redline observer on fuel pump inlet pressure. A noise problem was the cause of the high recorder reading and is being investigated. The next test is scheduled for 4/14/65.

3. S-II BATTLESHIP:

Buildup and checkout of all components for dry countdown has been in progress with a possibility of starting by 4/10/65. A second dry count will be run before the first test presently scheduled for 4/20/65.

4. MARINE TRANSPORTATION:

All equipment now under construction (i.e., two MTO barges, one KSC and one S-IC barge) is progressing satisfactorily.

MTO tug (Mule), under construction at Slidell, is progressing satisfactorily.

Tu 4/12

NOTES 4-12-65 HOELZER

B 4/13

Mr. Frederick T. Shaver, Chief of the Simulation Branch, died unexpectedly Friday evening, April 9, 1965. Dr. Polstorff was appointed Acting Branch Chief, and Ray Lawrence Acting Deputy Branch Chief, on Monday, April 12, 1965.

Have sent letter of condolence

B

NOTES 4/12/65 JAMES

PEGASUS: Pegasus B is progressing on schedule and will be shipped from Hagerstown to GE this week for low level one-axis vibration test prior to shipment to KSC by Friday of this week. Pegasus C schedule has been advanced and will be shipped to KSC approximately 6/30/65. MSFC has recommended and OART has approved that the prototype be held at Fairchild as a test bed for possible changes to Pegasus B and C and for calibration and lifetime testing, rather than long-term environmental tests as previously planned.

S-IB-1: No significant difficulties occurred during short duration firing on 4/1/65. Long duration firing is scheduled for 4/13/65 and shipment to Michoud is scheduled for 4/22/65.

S-IVB BATTLESHIP TEST PROGRAM: On 4/7/65 full duration propellant utilization excursion firing was terminated after 42 seconds due to a fuel pump inlet pressure instrumentation malfunction. Preliminary post test analysis indicates all stage systems were performing satisfactorily. The test is scheduled to be repeated on 4/13/65.

FLIGHT STAGE S-IVB-201: Stage checkout at Santa Monica was terminated 3/30/65 and LH_2 tank modification and parts shortage installation is continuing. Shipment to SACTO is scheduled for 4/30/65. As you recall, on S-IV-5 we had a similar condition in that we shipped to SACTO with parts shortages and limited checkout having been completed. As we had with S-IV-5, we plan to have continuous MSFC representation at SACTO while S-IVB-1 is there. Roy Godfrey, Jim McCulloch, and myself plan to rotate from early May through early August at SACTO. I will be there from 5/10/65 through 5/21/65 and from 7/5/65 through 7/9/65.

SATURN IB LAUNCH VEHICLE DESIGN REVIEW #5: (MRAZEK) A preliminary agenda for the Saturn IB Design Review #5 has been distributed. A meeting is planned with R&DO for 4/19/65 to finalize the agenda and the review will be scheduled for the latter part of April or early May.

GROUND COMMAND CUTOFF: (MRAZEK) We have been advised that Dr. Mueller is to review the Ground Command Cutoff decision. Dr. Rees has signed a TWX to Gen. Phillips supporting the decision he made, pointing out the type criteria which should be considered in utilization of the abort channel to the spacecraft and providing impact information for Dr. Mueller's review.

LH_2 EXPERIMENT: A review of the LH_2 Experiment has been scheduled at DAC, Huntington Beach, Calif. on 4/16/65.

GE/ESE SPECIAL TASK GROUP: Reference my notes 3/22/65 (copy attached.) Daily meetings have been held throughout this week and problem areas associated with I. U. checkout station for 201 appear to have been resolved. Delivery of this equipment is expected by 5/20/65. Problems identified with the breadboard equipment are still being reviewed.

Attachment: James Note 3/22/65 to Dr. von Braun only.

Fri 4/12

NOTES 4-12-65 Koelle

B 4/13

1. FY 65 STUDY MONEY: We have received 1.4 million dollars from Washington for the continuation of Saturn improvement studies. Because of the lateness of the money, there will be a gap in the effort, as we probably cannot be under contract before July/August for the new work. Our final presentation on last year's work is this week, April 14, and for top management a summary will be offered April 16, 9:00 to 11:00 a.m. in the 10th Floor Conference Room. You and your staff and all Laboratory Directors are invited for that summary presentation. ✓

postponed due to Mueller visit July 12 Nes date? B 4/22/65 9 to 11

2. ADVANCED STUDY REVIEW 1/65: On April 30, Ed Gray has requested a review on his program here at MSFC. We have offered the following topics for the agenda:

A Survey of 1964 MSF Studies

1965/66 Original Program and Present Outlook

Input/Output Formats for Space Program Simulation Model

Utility and Refinements of the Launch Vehicle Cost Model

Advanced Launch Vehicles

AES

Status, Problems and Plans in the LESA Area (Small Lunar Outport)

Film Report on Planetary Transportation Systems (Ehricke, GD)

We hope to receive Ed Gray's comments soon on this agenda proposal. ✓

K: O: BN

Bonnie

I'd like to attend as much as possible of this. Please coordinate my schedule for April 30 with Koelle's agenda, as I miss only the least important agenda items. B

NOTES 4-12-65 KUERS

1. Pressure Volume Compensator (PVC) Problem for 501: The outboard lox compensator failed again PFCT, this time during the last few cycles of vibration testing. The failure which occurred in the lower gimbal joint is being analyzed at Arrowhead Products. Information obtained by Zyglo inspection of the fractured area revealed that a crack occurred in the heat-affected zone of a multipass fillet weld. Metallurgical sectional investigation revealed numerous micro-cracks or more precisely grain boundary separation in the Inconel 718 material. These defects cannot be detected by X-ray inspection. Sub-assembly units for 501 containing the same weld joints were then inspected with Zyglo and also found to contain the same crack indications. A finished inboard lox compensator at MSFC for 591 was found to have cracks visible to the unaided eye. This unit is being immediately returned to Arrowhead for repair. At present Arrowhead with the aid of Marshall is working on a weld repair procedure in an effort to salvage the compensators for 501, with a minimum schedule delay. Delivery for 501 has now slipped from February (Plan VII Recovery Schedule) to June. By this qualification testing, a weakness in welding techniques was revealed that was not detected before by X-ray inspection. The back-up program for development of PVC's at Flexonics which had been started later than the Arrowhead program also experienced failures last week in the tenth impulse cycle of 200 specified cycles. Last week we thought the Actuators were the pacing items for 501; this week it appears that the PVC's are no better off.

2. Sizing of Lox Tunnels: Eight oversized Lox Tunnels for -F and -502 were successfully reworked last week by use of electro-magnetic swaging coils developed by Mr. Schwinghamer.

NOTES 4/12/65 MAUS

B 4/19

1. HUMAN RESOURCES SURVEY - Data from the laboratories, program offices, and staff offices has been submitted to the central coordinators and is to be delivered to Mr. Newby's Working Group today; analysis and compilation of the final report can begin immediately.

   General Bogart has requested that MSF review the data with the Centers prior to submission to Dr. Seamans' staff. We have proposed April 26 as the date for this review.

2. MANPOWER - MSFC's 185 summer student spaces, which are effective July 1, 1965, have been vouchered as follows:

19	Industrial Operations
15	Staff Offices
131	Research and Development Operations
20	Personnel Office for revouchering to elements, for special category summer employees.

   On the more important matter of permanent personnel complement, we received another inquiry last week from headquarters concerning withdrawal of MSFC's vacant spaces that have existed for some time. We countered with an explanation of our need to hire GS-4's and below, which also aids in reducing our average salary figure. As of April 2, R&DO was 11 understrength; IO was 68 understrength; and Staff was 33 understrength. Counting temporaries, co-ops, consultants, and permanents, the Center has 7,613 filled spaces compared to a ceiling of 7,658.

3. APOLLO COST STUDY - Prime Saturn IB, Saturn V, and Engine contractors have delivered the data initially requested of them, to the Director of the Launch Vehicle Study Team, and to MSFC. MSFC cost estimates for other than prime contracts (for the current programs) have also been delivered. Still to be submitted are:

   - estimates of cost to attain production rates contemplated by the AES Study Team, but which are beyond rates to be reached in the current program.
   - estimates of cost for launch operations support for the current program, from Saturn IB and Saturn V prime contractors.

   This study has been fraught with inadequate planning, confusion, and wasted effort which have resulted from the fragmented approach employed by the Apollo Cost Study Team. We have pointed this out to the headquarters leaders of the exercise, but it has been of little benefit in our efforts to minimize workload imposed on the Program Managers. The confusion has been somewhat compounded by the separate but very valid requests from the AES Study Team. These requests could have been integrated by the Apollo Cost Study Team, if there had been better direction by headquarters and better understanding of the workload on field centers and contractors.

H.M. Do you suggest a suitable letter to FEM? B

4. AES STATUS - Attached is a summary report on status of AES activity.

fw 4/12

NOTES 4-12-65 McCARTNEY

B 4/19

1. R&D OPERATIONS/IO RELATIONS: In accordance with your February 19 Guidelines, this office, in collaboration with IO, has prepared a proposal for developing work packages covering R&D Operations activities in support of IO projects. That proposal is being staffed in IO and was presented to the R&D Council on March 9. The proposal was approved in principle. It is now planned to proceed in working out the detailed arrangements.

2. SINGLE SUPPORT CONTRACT EVALUATION PLANS: The Performance Evaluation Board has approved the single support contract evaluation plans developed by the laboratories. The plans, including detailed operating procedures, will be submitted April 23 to Purchasing Office.

3. SINGLE SUPPORT CONTRACTS: All MSFC Single Support Contracts have been approved by NASA Headquarters and are now in effect, with the exception of the R-RP contract which should become effective this week. Only five firms, which had unsuccessfully submitted single support proposals, have requested debriefings. Of these, four have been completed satisfactorily; the fifth firm will be debriefed this week.

DIR

Tue 4/12

B 4/13

NOTES 4/12/65 RUDOLPH

1. ICD Operations - (MRAZEK) Reference Notes 4/5/65 Dannenberg, copy attached. The inference of a reversal of position by the Configuration Management Office is not understood. On March 12, 1965, Mr. Butler of Dannenberg's office met with Dr. Mrazek and other IO Program Office representatives to discuss assignment of required release dates to ICD's. Mr. Butler suggested that the program and project managers be requested to assign the dates. It was pointed out by the others present that determinations of ICD requirements by panels and working groups must include discussions of availability and need dates for specific vehicles, and that IO personnel must participate in all panels and groups for the purpose of providing program information. Memoranda from Mr. Dannenberg to various R&D chairmen on March 5, 1965, and March 16, 1965, request assignment or verification of required ICD release dates, which indicates agreement with the approach suggested to Mr. Butler. ✓

2. LOX Outboard Pressure Volume Compensators for 501 - (URLAUB) Reference Notes 3/29/65 Kuers, copy attached. As was reported in the April 2, 1965, S-IC-1 Status Review, the LOX Outboard Pressure Volume Compensators (PVC's) for S-IC-1 are in delay from Arrowhead and directly affect the sequence of assembly in the Thrust Structure. We learned that two of these PVC's have been received at MSFC and are in receiving inspection. In all probability, they will be released to ME Laboratory by the time you receive this note. This is just one of many items forcing an out of sequence installation situation on the S-IC-1 Thrust Structure. Analysis of the imposed work load is under way by Mr. Kuers. We understand, however, that from a cursory review that if all items of hardware can be delivered to ME Laboratory by June 1, 1965, work-around can be found to keep the stage on schedule (September 27, 1965, delivery to R-QUAL). ✓

3. S-II-S/D Stage - After completion of Stage and Test Tower instrumentation, structural testing was started on March 22, 1965 (early). Scheduled date for start of structural testing was April 1, 1965. ✓

4. Mechanical GSE Mission Contract with Boeing - was approved by NASA Headquarters on March 30, 1965. ✓

5. S-IVB-501 - Joining of the propellant tanks has been completed and the stage moved into the hydrostatic test tower at the DAC, Huntington Beach manufacturing facility for tank proof tests. The stage is currently on schedule. ✓

Attachments: 1. Notes 4/5/65 Dannenberg - DIR, I-DIR & R-DIR's copy only.
2. Notes 3/29/65 Kuers - DIR, I-DIR & R-DIR's copy only.

Tue 4/12

NOTES-4-12-65-SHEPHERD B 4/9

S-II-MTF: I. On April 5 Rieke, Lilly and Disher were briefed on the status of the S-II Complex. They were told that the present assessment indicated that S-II testing would be delayed some 5 months if acceleration was not undertaken, that with maximum effort the schedule would be such that the S-II-T testing time would be reduced from 2 to 1 month, and that the Corps had been directed on March 24 to accelerate all key items which were within our funding capability. A total shortage of $9.7M was indicated of which MSFC can fund $3.7M from other projects. The balance of $6.0M requires Dr. Seamans approval and Lilly prefers to go slow on this request until we are confident that we have identified all requirements. Lilly stated that Dr. Mueller made the following comments to him: (1) It is inconceivable that this schedule slip could occur without advance warning, (2) This is currently the most important facility in MSF and that all actions necessary to expedite should be taken, (3) Who, by name, in MSFC is the responsible person for MTF (Karl Heimburg) and the Corps (Col. Wessels), (4) that the S-IC stand must not slip. The status as of this date is that: (1) we have received authority for the reprogramming in the amount of $3.365M between MTF projects, (2) have identified $3.7M available for reprogramming from other locations, (3) Dr. Mueller has tentatively decided that the $8M for the J-2 Altitude Simulator at Santa Susana will be held for possible use at MTF, and (4) Key S-II construction contractors are working on an overtime basis.

Gen. Wilhoyt, was sent by the Chief of Engineers to Mobile, the MTF site, and Huntsville to assess the situation. He identified additional areas where the Corps needs to strengthen at both Mobile and MTF. He will probably report that meeting the new schedule is possible but optimistic.

II. Construction Contractors in the New Orleans area are very concerned that the use of overtime at MTF will escalate their costs on work in New Orleans and drain the labor market. Their representatives suggested that shift work be employed in lieu of overtime to reduce this possibility. There is a labor shortage in the area. To improve this situation by obtaining additional workers to permit shift work, Mr. Boh proposed that the Government sponsor a Washington meeting between interested Government agencies, appropriate Louisiana representation and the union heads to encourage the unions to supply more labor to the area.

Paul Styles supports the need for a meeting, however, it will not solve our immediate labor shortage and we therefore must resort to overtime on the S-II complex. Our present course of action is: (1) Look to Paul Styles-Gen. Wilson to set up necessary meeting in Washington, (2) Proceed on the present plan of overtime, and (3) if any future area is to be accelerated a more orderly approach can result in a maximization of shift work and minimizing of overtime.

NOTES 4-12-65 Stuhlinger

B 4/12

Fw 4/12

1. PEGASUS: A preliminary report on the status of Pegasus 1 as of April 2 has been prepared and delivered to Milt Ames with vu-graphs suitable for presentation to Dr. Seamans next week. This report will be the basis of a NASA publication within the near future. Would you like to see the report for Dr. Seamans? yes B

2. AES-RELATED NAA STUDIES: In response to a request from OMSF (E. Z. Gray), I visited NAA to discuss the scientific mission support studies for LESA and lunar surface exploration in general which NAA has been conducting for Headquarters. An impressive body of top ranking scientists have participated in this effort. The result is a number of "Panel Reports" on individual scientific projects and reports on recommended payload systems. NAA paid particular attention to the interface between scientists and engineers, and to the integration of scientific experiments into a well engineered payload at an early planning stage. One interesting result of this broad study is the suggestion that activities on the moon should be concerned primarily with astronomical and other space observations, and not too much with the nature of the moon. OMSF expressed the desire that MSFC take over Headquarters' role in the supervision of NAA'S contract, and even part of NAA'S role in the "coordination" of the scientific panels. I will discuss this further with deFries, Weidner and Maus. ✓ !?

3. TOTAL ART/SRT PROGRAM STATUS:

	ANNUAL PLAN	AUTHORIZED	PROCESSED TO FMO	OBLIGATED
OART	14,167,000	13,506,000	12,372,510	5,163,272
MSF	22,800,000	16,939,000	19,721,624	6,271,966
OSSA	827,000	827,000	822,949	26,681
OTDA	1,925,000	1,925,000	1,763,519	930,585
TOTAL	39,719,000	33,197,000	34,680,602	12,392,504

✓

4. UNIVERSITY OF ALABAMA HUNTSVILLE: Nearly $900,000 raised by the Huntsville Operations of the University of Alabama for a new graduate instruction building has been augmented by a Federal Grant of $420,900 which means that an excellent facility can be constructed for graduate education in Huntsville. ✓

5. SMITHSONIAN AIR & SPACE MUSEUM: S. Paul Johnston and Fred Durant visited RPL during their Marshall visit. They would like to get a Pegasus for the museum. We will investigate possibilities. We urged them to talk to the Air Force and Army for Thors, Jupiters and Redstones before it is too late. ✓

April 19, 1965

NOTES 4-19-65 BELEW

B 4/20

F-1 ENGINE

Test Stand I-E (Environmental test stand) RETS was activated April 13 with the firing of Engine F-2004. Testing will continue in order to check out the environmental conditioning facilities as well as the new stand. During this test some damage was sustained to the environmental enclosure. Extent of repair needed is currently being evaluated.

Proposed future changes in the F-1 Engine system are being reviewed jointly by F-1 Engine Project Office, MSFC Labs and Rocketdyne to determine the urgency, impact and scheduling for R&D and Production. The conditions and failure history that produced each proposed change are being reviewed to determine the urgency of the change and to give the contractor guidance before submittal of the ECP.

J-2 ENGINE

A successful 507 second firing was accomplished on the S-IVB Battleship April 15. The engine was operated at the minimum mixture ratio for approximately 215 seconds.

The engine for SA-202 was delivered to DAC/Huntington Beach April 13 and the first engine for S-II-T was delivered to S&ID April 15. Both engines had all engine modifications installed.

Negotiations to convert the J-2 Engine Production Contract, NAS8-5603, to a Cost-Plus-Incentive-Fee will convene Tuesday, April 20.

S-IVB ULLAGE ENGINE - ROCKETDYNE/GEMINI

The third MSFC Qual engine was delivered April 9. To date a total of six (3 DAC, 3 MSFC) engines have been delivered by Rocketdyne, all meeting schedule requirements. The vibration fixture from DAC for use in the MSFC Qual program was delivered April 8. This fixture will simulate the mounting arrangement of the attitude control and ullage engines in the APS Module.

RL10 ENGINE

The injector configuration for the five prototype RL10A3-3 engines has been chosen, and four more development injectors are being modified to this configuration to check repeatability of the Isp attained (443-444 seconds nominal). These engines are on schedule for October/November 1965 delivery.

The A-3-3 start transient program was continued with satisfactory results. CMRV starting flow and opening pressure, and cooldown valve closing pressures have been established.

The Air Force Hydrogen Plant 74 is back in production following repair and maintenance.

H-1 ENGINE

The duration test of S-IB-1 was successfully conducted April 13. Preliminary data indicates engine hardware and performance was satisfactory except for the thrust chamber on Engine H-4046 at Position No. 7. An internal fuel leak was discovered during post test inspection. This leak exceeded specification limits; therefore the engine will be replaced by a spare engine and the damaged engine will be refurbished. This is only the second instance of a failure of this nature during 200K engine testing. A detailed investigation will be conducted. No vehicle schedule impact is anticipated.

NOTES 4-19-65 CLINE B4/26

1. FULL DURATION FIRING CONDUCTED ON S-IVB BATTLESHIP ON 4-15-65: Test duration was 506 seconds. Engine side loads damped approximately 6 seconds after engine ignition. All systems functioned satisfactorily.

2. S-IB-201 ENGINE THRUST CHAMBER TUBE DAMAGED: After acceptance duration firing, a leak was detected in a thrust chamber tube (1/8" slit 13" below the injector face) of the engine in Position 7. Engine replacement will probably be required, since proven repair procedures are not available. Rocketdyne is developing field repair procedures.

NOTES 4/19/65 CONSTAN

B 4/26

1. S-I-10

Vehicle was returned to checkout on April 9, 1965, because of ripples discovered in Fuel Tank No. 3. Repair, and testing, including pressurization, resulted in Material Review Board determination that the tank is acceptable for flight use.

2. S-IC-D

The hydrostatic test of the "D" Vehicle Fuel Tank has experienced about two weeks' delay due to problems with the test facilities. Valve and hardware operation and leakage are the main problems. We are pushing Boeing to complete this job since this test position is loaded in an end-to-end fashion and is the PERT reported constraint on "F" vehicle delivery.

3. Quarterly Review S-IC

This review is scheduled to occur April 28 and 29, 1965, in Huntsville.

NOTES 4-19-65 DANNENBERG B 4/26

1. AES Experiment Integration - Earth orbital experiments were analyzed for incorporation into the S-IVB and Instrument Unit with the assistance of IBM. Out of the list of experiments defined by Headquarters and DOD, approximately 20 were selected as candidates and will be reported to Headquarters through de Fries on Tuesday. A rundown can be included in your Experiments Briefing prior to the next Experiments Board Meeting (MSFEB) at Headquarters if you wish. ✓ Yes, please B

2. Data Management - R&D Operations Administrative Instruction for Automatic Distribution of Documents has been implemented. A comparison by MS-D has been made showing the old distribution list versus the new. R&D Operations has reduced their requirements for automatic distribution well over 50%. ✓

3. Crew Safety - The discrepancies between MSFC and contractors on criticality numbers (Failure Effect Analysis, PSAC discussion!) have been straightened out between MSFC, Boeing, and Chrysler at Michoud last week. In general, the criticality of explosion failures on the first stages had been overestimated. ✓

If Phillips' decision on ground abort stands, we will have this capability on unmanned IB flights. ✓

4. S-IVB Critical Design Review - Phase I of this review was completed on 4-16-65. This phase identified drawings defining the S-IVB stage configuration for SA-201. Phase II will constitute a review of subsystems and will be completed during the week of 4-26-65. R&DO is supporting the stage manager and is utilizing the project engineer concept. The end result of these reviews is the baseline for configuration control. ✓

NOTES 3-19-65 FORTUNE B 4/26

1. Activation Personnel - Critical problem is getting specialized personnel required for activation.

a. NASA - Inability to recruit at proper GS level. ✓

b. General Electric - is restrained from boarding personnel due to their inability to accept the activation concept and/or take the necessary management action to revise an inappropriate and ineffective management structure to meet activation requirements. 222

c. S&ID - Although S&ID has qualified personnel, they are restrained from boarding specialized personnel by the completion of battleship firing prior to the release of these personnel to MTO.

d. Boeing - Manpower has been appropriate and timely in all assignments and performances required by activation. ✓

2. S-IC Test Stand B-2 - end to end network was completed Wednesday. Inputs to Slidell Computer Center were made Thursday with printout being received Friday. Final revision will permit the first cut of a management review during the week of 10 May. This marks the first time Slidell has been used for this purpose by Activation personnel. ✓

3. Test Stand A-2 / SII-T - requirements integrated end to end network completed Thursday. B&M BOD's, particularly on PLS, cryogenics, and high pressure gas systems, are extended too far to permit completion of GSE and systems checkout. It will be necessary to accelerate specific BOD's over and above those already accelerated in order to maintain current planned schedule. ✓

4. USAF Western Contracts Management Region to help us in Quality Control - Col. Lehner, Messrs. Murray, Conklin and Dickson were in Thursday with Walt Clements from MSFC Quality Lab. They promised to send eleven inspectors around GS-11 with Missile Sites Activation Experience as advance echelon of Project 60 or DCAS Plan. ✓

5. Third fatality - Thursday a.m. at 0450, a tire repair man was crushed under the wheels of a euclid. This is the second such occurence in the S-II area. The Corps of Engineers is investigating. ✓ !

NOTES 4/19/65 GEISSLER B 4/26

1. Flight Mechanics Panel Meeting, April 13 - 14 at MSC: As follow-up to last management council meeting, the implications of using direct ascent profiles (no S-IVB restart) were again discussed with MSC. The limited flexibility of direct ascent to moon, compared to earth parking orbit mode, restricts length and number of launch windows during which all of the flight constraints can be satisfied. Without the daylight constraint on earth, the required lunar lighting conditions result in 5 monthly launch opportunities (of 3 or more days duration), during June through October. If "free-return" requirement is eliminated, co-rotational lunar approach may become permissable. This would add four launch windows in March through June, leaving only November through Feb. without 3 day minimum opportunities. The major open question is the large maneuver required at moon, to return to earth, if the service module propulsion fails. The LEM propulsion is very marginal at best for this purpose. For ascent through parking orbit under the same conditions, there is one 10 day launch window every month for "free-return" flights. Co-rotational flights will extend these to 19 days each per month. In addition, MSC mentioned that the lunar lighting constraint may be modified to allow the sun to be either from the rear (present scheme) or from the front of the astronaut during landing. Allowing both of these solar positions would allow the same improvement in the launch window as that indicated for co-rotational trajectories and would still allow the use of free return flight profiles. No direct action items on either center were generated, however the studies will be continued.

In the discussion of use of spacecraft guidance hardware to back up launch vehicle guidance during ascent it was agreed that MSFC equations (iterative guidance) would be programmed into spacecraft for back-up during the S-II and S-IVB first burn portions of flight. Resolution of guidance equations for back-up during S-IVB second burn is still pending. A meeting is to be held at MSFC on April 22 with MSC and MIT representatives to plan action and studies to implement this agreement.

Remaining action items and agreements will be forwarded to you later.

2 Saturn IB (two stage)/Polar Orbit: Re: question concerning performance capabilities raised in presentation to you on this subject in March: Preliminary results indicate an injection capability into a near 100 na. mi. circular polar orbit of $\approx$ 26,000 pounds (forward of IU) for flight down a 140° launch azimuth with overfly of Cuba and Panama. Yaw steering was introduced at flight time of 100 seconds of flight with resulting flight trace very close to coast of Florida. MSC personnel are expressing interest in this study in connection with AES. Extensive work still remains before study completion of S-IB/S-IVB flight to polar orbit. Upon completion of study using the basic two stage IB configuration, advantages of a sub-orbital start of the SM will be investigated.

3. Orbital Studies: Mr. Jackson, GSFC, Pegasus A STADAN Network Director, has agreed to send an additional 2 weeks of SA-9 Minitrack tracking to our Flight Evaluation and Operations Studies Division. This data will be used by Lockheed in conjunction with Minitrack data received earlier to more precisely define the current atmospheric density levels at 500 - 750 km altitudes.

NOTES 4-19-65 GRAU

B 4/26

1. CALIBRATION ACTIVITY: Requirements for support from the Laboratory's Electrical Standards Laboratory have increased by 100% in the past year, and continue to grow. Increased experience, almost no personnel turnover, more efficient methods, and discreet use of overtime have allowed this section to keep pace during the period while devoting only 30% more manpower to the Electrical Standards area. To cope with the continued increase in demands for this service and recent restrictions in overtime, a study has been made with the objective of extending calibration cycles, thereby effectively reducing workloads. As a result calibration intervals were extended on almost 2,000 electrical items with a net manpower savings of over two manyears of effort. A similiar study is underway on mechanical equipment. The mobile pressure calibration van which this Laboratory placed in operation in late November, 1964 has been used to calibrate 508 pressure and vacuum gages "in place." This has resulted in considerable manhour savings by elimination of the necessity of component removal and transportation to fixed calibration facilities, and in some cases elimination of major disassembly of consoles. The most significant use of the van to date was the calibration of all gages in the Test Laboratory S-1C and F-1 static test stand water pumping station. This effort was incorporated as part of the acceptance checkout of the pumping station. In order to meet MTO activation schedules, this Laboratory made arrangements for the AMSC Calibration Center to provide mobile calibration service to the GE operated Standards Laboratory at MTO. The vans arrived at MTO last week and are now in operation. This Laboratory will continue to certify standards for MTO. ✓

2. Q&RA LABORATORY SUPPORT IN THE ESE AREA: The Quality and Reliability Assurance Laboratory effort in support of the Electrical Support Equipment has increased substantially over the past several months. A Senior Laboratory Representative has been installed at the General Electric Company facility on South Memorial Parkway who will coordinate the Laboratory's activities on the ESE contract. The Birmingham Procurement District, the delegated Government Inspection Agency, has five resident inspectors in the GE plant and is considering our request to help us staff the GE receiving, modification and checkout areas at MSFC. An emergency Deviation Approval Request has been established for quick reaction to hardware and shortage problems, and visibility charts will be maintained in this Laboratory to foresee problem areas and to assure that they are not due to Quality action. ✓

NOTES 4/19/65 HAEUSSERMANN

B 4/26

1. DYNAMIC GUIDANCE SWITCHOVER: The planned approach to the use of the spacecraft guidance system to steer the S-IVB has been to have the crew switch the systems during orbit. This provided a "backup" or "alternate" mode to protect against failures in our simplex platform. This approach still left the possibility of the loss of approximately one flight in two hundred due to the ST-124-M system failing during powered flight.

We agreed with MSC last week during the Flight Mechanics, Dynamics, Guidance and Control Panel Meetings to work out a joint detailed plan involving study, analysis, and simulations with flight hardware that would lead to the MIT system "backing up" the ST-124-M during powered phases where feasible. This plan would aim at SA-503. MSC stated their willingness to utilize our steering equations during the flight to insertion in order to have this possibility. We will have weekly meetings at the working level to accomplish this task. The first meeting will be here this week. ✓

2. LAUNCH VEHICLE DIGITAL COMPUTER/DATA ADAPTER MATING TESTS: Two computers, Breadboard No. 1 and Simplex No. 2, and one data adapter, Breadboard No. 1, have been delivered to MSFC. Two Aerospace System Test and Evaluation Complexes (ASTEC) are functional at MSFC.

a. Simplex computer No. 2 and data adapter BB#1 were mated with the platform and accelerometer signal conditioner 4/5. They were found to be compatible and capable of communicating with each other. The computer system and platform will be mated again 4/19 and 20 when detailed measurements will be made.

b. The data adapter and ASTEC were mated with the 410 Multiplexer and a Computer Interface Unit. All interfaces and system operation with these units were verified by interchanging information between these units.

c. The computer/data adapter system has been connected with the RCA-110A in the IB Breadboard. The computer/data adapter is located in Building 4487 and is connected to the 110A through approximately 500 feet of cables. The 110A has sequenced power to the flight hardware and the interfaces have been checked through exchange of information between the two systems.

Some discrepancies were noted in these tests but nothing is considered alarming at this time. ✓

3. S-IC SERVOACTUATOR STATUS: Negotiations for the third and final MSFC S-IC servoactuator procurement was conducted 4/7-9 and 4/14-16 with Moog and Hydraulic Research, respectively. Notice of award for 30 units was given to Moog on 4/12 and it is anticipated that Hydraulic Research will be given contractual coverage on 4/19 for 20 units. This procurement covers units for Rocketdyne and flight vehicles through SA-503. The short form procurement plan for these units was initiated 8/64. This delay in getting a contract has caused considerable rescheduling of hardware covered by earlier contracts in order to deliver flight hardware to SA-501. This also causes considerably less than the desired test and evaluation time before the first delivery of flight hardware.

Fixed price incentive contracts were desirable with both contractors; however, Moog would only negotiate a firm fixed price-type contract. First delivery is scheduled for 9/65. Hydraulic Research was receptive to a fixed price incentive contract, and the first delivery is scheduled for 8/65. ✓

NOTES 4/19/65 HEIMBURG

B 4/26

1. S-IC-T:

The first five-engine firing was performed successfully for 6.5 seconds mainstage, 4/16, 47 days after the stage was placed on the test stand. Nothing obviously wrong was observed. Test results, including acoustics, are in process of evaluation. The next firing is scheduled for 5/6/65.

2. S-IB-1:

Test operations are complete, and stage will be removed from the test stand tomorrow, 4/20. Chrysler completed this whole operation in a record 5½ weeks from placing the stage on the test stand.

3. S-IVB-SACTO:

S-IVB battleship successfully completed a 506-second duration firing on April 15, 1965.

4. S-II BATTLESHIP:

S&ID has been trouble-shooting the control system this week in an attempt to complete a dry sequence test. The 5-engine ignition test is rescheduled for approximately 4/22/65.

5. S-IC BARGE

The S-IC barge is under construction at the Avondale Shipyard, Harvey, Louisiana. Work is on schedule.

6. MTF COMPONENT TESTING:

The first of the MTF components to be tested and checked out in Huntsville, a liquid hydrogen vaporizer, was successfully tested last week, and will be returned to MTF.

B 4/26

NOTES 4-19-65 HOELZER

1. GENERAL ELECTRIC CONTRACT: Proposals have been received and evaluated for a one year extension to the present General Electric Single Support Contract. Negotiations are scheduled to begin April 20, 1965, and are expected to be completed before the end of the week. ✓

2. COMPUTATION LANGUAGE FOR TRAJECTORY CALCULATIONS:

A contract for $47,375 has been awarded to General Dynamics for development of a computer trajectory language. Work will begin on April 19, 1965, when three General Dynamics people are scheduled to arrive at MSFC. ✓

A Language Review Committee has been named for receiving inputs from other laboratories concerning language requirements. The committee has already made substantial progress in this area. This committee will also serve to keep other laboratories informed on the advantages and capabilities of these higher level computer languages. ✓

B 4/26

NOTES 4/19/65 JAMES

SA-8: Prelaunch checkout at KSC is proceeding satisfactorily, however a potential problem was detected late Friday. Contamination has been discovered in the hydraulic actuator package. The source of this contamination has not been established. This problem is under extensive investigation and no decision has been made at this time concerning the need to remove and repair.

S-IB-1 STAGE: Long duration firing was conducted April 13 resulting in a 142 second run with an average thrust of 201.56K. Post static inspection revealed a split tube on Engine Position #7. The engine will be replaced with a spare when the booster returns to Michoud and the damaged engine will be repaired for use as a spare.

S-IVB: The full duration propellant utilization excursion battleship firing (low mixture ratio) was held April 15 with a successful 509 second run. The initial propellant loading for the facility checkout vehicle, which was originally scheduled for Saturday, will be conducted Tuesday, April 20.

PEGASUS: Pegasus B underwent successful vibration tests at GE and was shipped to KSC on April 15.

ESE ASSESSMENT GROUP: I am quite pleased thus far with the results of the ESE Assessment Group. The IU checkout equipment schedule has been improved by approximately one month with delivery scheduled for May 24 and the breadboard equipment delivery schedule has been improved by about two weeks with delivery scheduled for May 7. This does not imply that we are completely out-of-the-woods but indicates what can be accomplished with proper Center emphasis.

SPACECRAFT DESIGN ENGINEERING INSPECTION: (MRAZEK) The Apollo Spacecraft airframe for SA-201 design engineering inspection will be held April 20 thru 22. We have accepted Dr. Shea's invitation to attend.

PROPOSED MSF FLIGHT MISSION DIRECTIVE: The proposed MSF flight mission directive for SA-201 has been received. We feel this document is far too detailed for publication as a control document at this time. Further, I feel control on many of these detailed requirements by Headquarters will seriously impair the management prerogatives we must freely exercise here at MSFC. I intend to discuss this matter further with you and Col. O'Connor, identifying specific details to which I refer and prepare a letter for your signature to General Phillips.

LAUNCH COMPLEX 34 WET TEST: We received a proposal from KSC this week to modify plans for the wet test. This modification provides for the delivery of S-IB-1 (flight stage) in August to be used with the remaining portions of the facility vehicle. Concurrent with wet test, S-IB-1 checkout can proceed and immediately after wet test the other flight items will be assembled to complete the vehicle prelaunch checkout. This approach provides some additional degree of insurance for the SA-201 launch schedule and we are proceeding to execute this plan.

NOTES 4-19-65 Koelle B 4/26

1. FY 65 MSF LUNAR MISSION STUDIES: Dr. F. Dixon of Ed Gray's office told us that Dr. Seamans orally approved, on April 9, the following FY 65 advanced system studies (Project 981):

a. Mission Modes and Systems Analysis for Lunar Exploration	900K
b. Lunar Surface Mobility Systems Comparisons	500K
c. Early Lunar Shelter Design and Comparison	200K
	1,600K

The objectives of these efforts are:

a. To analyze the objectives of a lunar exploration program and to study candidate systems to meet these objectives. The data produced by this study will provide the decision-making inputs for the orderly evolution of lunar exploration systems from AES through scientific stations of indefinite lifetime. Specific questions are, e.g., number of AES flights; degree of Saturn V uprating.

b. To obtain engineering designs and program estimates of a mobile LEM (MOLEM) and a mobile orbital survey module for lunar surface exploration, and to compare these designs with MOLAB.

c. To define conceptual designs for both an optimum lunar shelter and for a shelter derived from an orbital survey module, either of which could be delivered to the lunar surface by a LEM truck.

It is of interest to note that all the available advanced study money in the lunar area is expected to be transferred to MSFC.

2. FY 65 MSF PLANETARY MISSION STUDIES: Dr. Seamans plans to decide upon manned planetary mission studies within the next four weeks. The following proposals are on his desk:

a. Apollo Planetary Exploration: Flyby	MSFC	400,000
b. Nonstandard Mission Profiles	NASA Hdqs.	150,000
Improved Standard Mission Profiles	MSFC	150,000
c. Standard Interplanetary Spacecraft	MSC	300,000
d. Logistics to Support Earth Launch Operations for Manned Interplanetary Missions	KSC	200,000
		$1,200,000

It appears unlikely that all of these will be approved. He is now aware of the Nerva II decision problem and probably approves something to help him to make that decision at the appropriate time.

NOTES 4-19-65 KUERS

B 4/27

S-IC-501: The Fuel Tank passed its pressure test milestone one week ahead of schedule and is currently in calibration.

NOTES 4/19/65 MAUS B 4/27

1. POP 65-2 - We are currently preparing POP 65-2 for submission to MSF. Headquarters' Guidelines are being received two months too late, and there is much variance in the requested dates for the various portions of this submission - seven due dates ranging from tomorrow through May 10. Guidelines have still not been received for FY 67 C of F, nor for Tracking and Data Acquisition, and Technology Utilization.

   We are encouraging MSF to establish a more effective single point of contact for communicating all budget matters with MSFC. ✓

2. REVIEW OF SS&A TESTIMONY - As requested by your office, Bill Fondren has gone to Washington, where he reviewed the transcript of Dr. Newell's and Mr. Cortwright's Testimony before the House Sub-Committee on Space Sciences and Applications. Copies are not yet available for field centers. A written report of Fondren's review will be furnished to you shortly. ✓

3. ORGANIZATION - The Marshall Mission Statement has cleared MSF, and is in Jack Young's office. Mr. Webb's approval is expected in a few days. Also, expected to be approved shortly is the organization for the new Manpower Utilization and Administration Office to be headed by Mr. Keith Wible. ✓

4. PROJECT FORECAST - We have reviewed the MSF comments (classified) on Project Forecast, as forwarded from Dr. Mueller to Adm. Boone who is consolidating NASA's comments to DOD. The MSF package includes all of MSFC's comments except a few that were minor. Other comments included by MSF were in the areas of Bioastronautics and Communications. ✓

   We have relayed E. Z. Gray's compliment on the "excellent analysis of the material" to R&DO, who performed the review for MSFC. ✓

   If desired, we can furnish summary of the MSF package, or of the final NASA package when available. ✓

5. HUMAN RESOURCES SURVEY - Schedule for review of the results of MSF's Human Resources Survey is as follows:

Review w/Dr. Rees and Mr. Gorman	Apr. 22
Review w/Gen. Bogart and Mr. Kahao	Apr. 26
Review w/Dr. von Braun	Apr. 29
Final submission to Adm. Rose and Dr. Mueller	May 1 ✓

NOTES 4-19-65 McCARTNEY

B 4/27

1. DISTRIBUTION REQUIREMENTS FOR TECHNICAL DOCUMENTS: During Management Services Office's manpower audit last fall, it was indicated that R&D Operations' requirements for distribution of technical documents (i. e., drawings, drawing lists, parts list, specifications, etc.) was possibly excessive. As a result, Mr. Weidner directed this office to investigate and make recommendations for appropriate corrective action. As a result of a joint effort, involving all elements of R&D Operations, a new system was activated for establishing and controlling R&D Operations' requirements for these documents. A recent analysis made by Management Services Office indicates a significant reduction in requirements. Although in some areas it is not possible to make a direct comparison between the new and old system, we estimate that approximately a 50% reduction in distribution requirements has resulted. ✓

2. HUMAN RESOURCES: Material submitted by the laboratories in response to the Human Resources (Rose) Study has been reviewed and consolidated, and a summary furnished to Executive Staff. The analysis showed that significant changes have been or are in the process of being made in the reassigning of assistants to line operations. The summary data from R&D Operations, when consolidated with information furnished by other organizational elements, should provide data to NASA Headquarters that is essential to them in supporting Marshall's position on the average grade structure. ✓

B4/27

NOTES 4/19/65 RUDOLPH

1. Configuration Management - During the Configuration Management presentation to you by Major Jeancon on Monday, April 12, 1965, an IO Configuration Management Staffing Chart was shown which depicted a Saturn V requirement of 24 personnel for configuration management implementation at the Stage level as compared to a I/IB requirement of 7 personnel. I feel a note of explanation is in order since a direct comparison of these requirements is misleading. The Saturn V requirement of 24 included 5 personnel (1 per office) for Data Management (Configuration and Data Management are organizationally combined in each Saturn V Stage Project). Also included were four existing personnel at S-II Resident Office who are involved in change coordination in addition to other on-site duties. Personnel involved in similar functions at the S-IVB/IB Resident Office were not included in the I/IB requirement of 7 personnel. The Saturn V personnel requirement of 24 should have therefore read 15 (24 -5 for Data Management -4 @ S-II Resident Office = 15).
The following Summary is submitted for your information:

CONFIGURATION MANAGEMENT PERSONNEL SUMMARY

	Stage	Saturn V	Saturn I/IB
	S-IC	3	
	S-II	5	
	S-IB		3
*	S-IVB	2	0
*	IU	3	2
	Vehicle GSE	2	2
	Total	15 ✓	7 ✓

*Integrated Saturn I/IB and Saturn V Stage Organizations

2. S-IC-1 Stage - The fuel tank hydrostatic testing and cleaning was completed last week (April 12, 1965) on schedule. The LOX tank helium bottles are installed and close out weld will be made this week (April 19, 1965). ✓

3. S-II Battleship Stage - Dry count down prior to cluster firing was started on April 9, 1965 and completed on April 17, 1965. Tanking tests started today, Monday, April 19, 1965, and cluster ignition is scheduled for April 22, 1965. ✓

4. S-IVB-501 Flight Stage - The stage has completed proof testing and is now undergoing leak and dye checks. The stage continues to be on schedule in the structural manufacturing area. Problems still exist in the engineering release of electrical design. DAC has implemented a recovery effort, and we feel that the current delivery requirement can be achieved. ✓

NOTES-4-19-65-SHEPHERD B 4/26

S-II-MTF Labor: A meeting was held in Senator Long's office attended by representatives of Louisiana, Corps of Engineers, and NASA (Bill Lilly) to discuss the effect of the MTF acceleration on the labor market. Mr. Lilly indicated there were threats made by the people from Louisiana along the lines that if MTF construction is placed on overtime they (Louisiana) would be forced to place their industrial construction workers on overtime. The results in this case would be that our construction workers would leave the Mississippi area to work in Louisiana. We do not consider this a valid ~~statement~~ argument. The group was told by Mr. Lilly that it was not possible to take the pressure off the S-II. Senator Long apparently did not contribute too much, his office was used as a forum to discuss this matter. Senator Long's reaction was summed up by Lilly as, "too much work- wasn't this a wonderful thing". The Corps of Engineers has the action to survey the labor market to determine the number of people by crafts that will be required in our acceleration effort. This may lead to a meeting at the site with local labor unions and eventually to a meeting with a higher union level in an effort to supply additional workers. ✓

Corps of Engineers Key Personnel: The major consistency the Corps has demonstrated during the past year is their ability to change key officer personnel. Added to the list are the following:

Gen. Welling retires in June
Gen. Wilhoyt will be reassigned in May to the South Pacific Division
Gen. Wilson will retire in July.

If you consider the departure of Cols. Raymond and Roberts last summer these changes in personnel are generally equivalent to NAA changing Messrs. Atwood, Storms, Parker and Wickham within a years time. ✓

NOTES 4-19-65 Stuhlinger

B 4/27

1. PEGASUS A: For the first time during the flight of Pegasus A, 1.5 mil panels have failed last week. From the analysis which we could perform so far, it appears that the reason for failing is probably the same as that for failures of other panels. From investigations initiated by Pegasus Project Office, it seems that the primary cause for these failures is the inclusion of little pieces of foreign matter between the capacitor plates. The Project Office suggested to burn these fragments out by brief application of over-voltage. This method will be used on Pegasus B panels. ✓

Milton Ames will hold a "buy-off" meeting on Pegasus B probably on Friday this week at KSC. ✓

2. CISLUNAR PEGASUS: Our presentation of a Cislunar Project Development Plan to Dr. Mueller, Dr. Bisplinghoff, and other members of OMSF, OART, and OSSA in Washington last week did not meet with the approval of Dr. Mueller and Dr. Bisplinghoff. We had tried to find an acceptable compromise between the diverging guidelines from OMSF and OART; however, the proposed system was too elaborate and expensive for Dr. Mueller, and too modest from the standpoint of meteoroid environment exploration for Dr. Bisplinghoff. It seems that we can do justice to the guidelines of the two Program Offices only by proposing two different systems, one minimum Pegasus system to OMSF, to be flown on the Saturn IB/Centaur, and one more elaborate meteoroid technology and measuring spacecraft to OART, to be flown on a yet undetermined spacecraft at a later time. ✓

The result of further discussions with Dr. Mueller on April 16 and 17 will be a joint effort between Pegasus Project Office (Dr. Johnson), Cislunar Project Office (Mr. Brooksbank), and Pegasus Evaluation Group (Dr. Dozier), to arrive at an absolute minimum Cislunar Pegasus Project following strictly the guidelines from OMSF. ✓

3. AES PROGRAM: The request by Mr. Raffensperger, OMSF, to include the management of "Space Operations Techniques and Subsystems" in this Center's part in the AES Program has increased the scope of this program very considerably. I believe that the question of this Center's potential and acceptable involvement in the AES Program should be discussed with E. Z. Gray in the near future with the aim of arriving at an outline of our Center position with respect to AES commitments. ✓

4. FY-66 OART PROGRAM STATUS: The OART FY-66 Program Submission is almost ready for transmittal to HQ. The submission, which was due in HQ on April 15, is expected to be forwarded on or about April 23. The delay is due to late submissions by some of the Laboratories, and an inadequate staff to technically evaluate and administratively accomplish the activities necessary for program formulation and preparation. ✓

April 26, 1965

NOTES 4-26-65 BELEW

B 4/28

F-1 ENGINE: Since the April 5 notes which spotlighted the turbine manifold (René 41) cracking problem, Rocketdyne set up a team composed of Engineering, Quality Control, and Materials and Processing Lab personnel to investigate all aspects of the problem. Stresses resulting from fluctuations in heat transfer during welding will be controlled with the May activation of a Government Furnished Automatic Welding machine (approved about 1 year ago) to make all circumferential welds.

Also based on your question to Mr. Kuers regarding possible ME Lab assistance, Mr. Gordon Parks, a welding specialist of that laboratory, visited Rocketdyne during this report period. His findings should be available next week. ME Lab's quick response to this request is appreciated. (Thermal insulation is a second area in which ME Lab will be asked for assistance. I will discuss in more detail next week).

Mr. E. Cataldo of Materials Division of P&VE Lab had previously looked into this matter and assured us that Rocketdyne is exhausting all possibilities in the Materials area to understand and solve the René 41 cracking.

RL10 ENGINE: The Air Force at EAFB has awarded a 6-months contract to a Rocketdyne and Douglas team to study the feasibility of modifying the RL10 engine versus development of a new throttleable engine for a Maneuverable Satellite. We are working with Bob Wiswell at EAFB in supplying information and reviewing their studies.

S-IVB ULLAGE ENGINE - ROCKETDYNE/GEMINI: The second MSFC Qual engine successfully completed the off-limits testing on April 22. The third MSFC Qual engine delivered April 9 will be returned to Rocketdyne for repair of pin hole gas leak at the chamber pressure tap. The fourth MSFC Qual engine has been shipped by Rocketdyne.

J-2 ENGINE: A duration firing on the S-IVB Battleship is scheduled for this week. To date the J-2 engine installed on this test stand has accumulated 1060 seconds of test time.

Engine 2020 has completed hot fire acceptance testing and is presently going through the second E&M checkout. This engine is the first deliverable engine with restart capability and will be delivered to DAC for S-IVB Battleship testing.

Fact finding meetings with Rocketdyne, relative to initiation of negotiations to convert the J-2 engine production contract, NAS8-5603, from CPFF to CPIF started April 21. Representatives from NASA Headquarters (Col. Seccomb; Lt. Col. Hoptay; Messrs Linn, Lemke, King, Becker, Vecchietti, Linnerooth, Cariski, Waller, Wetherington, Holland) were at MSFC on April 23 to review the J-2 production incentive structure prior to formal negotiations with Rocketdyne.

A successful "ignition only" test was conducted on the S-II Battleship stand (all five engines) Saturday night, April 24.

H-1 ENGINE: In view of vehicle structural limitation, the H-1 Engine specification is being changed to reflect a maximum thrust level of 206K in lieu of 208 $^{+4}_{-3}$ K. Demonstration of reliable performance at the upper limit of the specification will be accomplished to provide confidence for a flight configuration effective on Saturn IB Vehicle SA-206 and subsequent.

NOTES 4-26-65 CLINE

B 4/28

NEGATIVE REPORT

NOTES 4/26/65 CONSTAN

B 4/28

1. S-I/IB

Status of S-I-10 - Vehicle was moved from checkout bay # 1 after repairs were completed on fuel tank # 3. The repairs involved removal of ripples in the tank skin. X-ray, dye penetrant, and pressure tests indicated that the structural integrity of the tank was upheld. Vehicle is now undergoing post-static optical alignment.

The problem of ripples in the skin of fuel tank # 3 on S-I-10 as reported in last week's report has been found on vehicles S-I-8 and S-IB-1. These skin ripples have occurred in approximately the same locations on fuel tank # 3 only on all three vehicles. Investigations are being performed to determine the cause of these ripples.

Spider Beam - During qualification testing of the S-IB second stage adapter on February 21, 1965, one 70" LOX tank fitting and both ends of the four radial beams located above the LOX tanks failed between 100% and 110% of flight loads. The failure in the radial beams is similar to that experienced on the S-IB-D/F stage during dynamic testing in Huntsville. Analysis of the failed parts and load conditions are now in process.

2. S-IC

Fuel Tank - S-IC-D Vehicle - The fuel tank has been cleaned and is located in the Hydrostatic Test Position; conversion coating operation is presently being inspected. The Hydrostat Facility is still going through certification and Hydrostatic Test is rescheduled for this weekend.

LOX Tank - S-IC-D Vehicle - The LOX tank is complete and is scheduled for transfer to the Hydrostatic Test Position upon removal of the "D" Fuel Tank (about May 1, as estimated by The Boeing Company).

B 4/28

NOTES 4-26-65 DANNENBERG

1. AZUSA/MISTRAM Decision - Based on Dr. Haeussermann's recommendation, a joint meeting on 4-15-65 between IO and R&DO representatives concluded to delete MISTRAM entirely from the Saturn program. The AZUSA System will be used for both IB & V and be updated to the "G" model configuration to meet NASA standards. Dr. Mueller was during the April 16 presentation informed about and agreed with this decision. However, unknowingly, NASA Headquarters sent a TWX to KSC on 4-16-65, stating that before decision on selection of the AZUSA or MISTRAM System can be made, more information is required from KSC. IO has been requested to clarify this situation with NASA Headquarters and KSC, and to provide definitive instructions for deleting MISTRAM from the Saturn vehicles. ✓

2. Analysis of Pre-Flight Operations - R-DIR has approved a plan for performing Analysis of pre-flight operations for the Saturn V program. This analysis will: (1) verify GSE requirements; (2) establish spares and maintenance requirements; (3) develop contingency planning; and (4) develop pre-launch test and checkout requirements. IO will provide engineering support from Boeing and overall program direction. R&DO will perform the work. ✓

3. Mission Assignments - The SA-501 Mission Objectives were furnished to IO for inclusion in the Apollo Flight Mission Assignments document. A recent publication of this document dated 2-19-65, included flight mission objectives for Saturn IB vehicles 201 through 203. ✓

B 4/27

NOTES 4-26-65 FORTUNE

1. Local Contractors reject AHAC for Mississippi - Two of the Presidents Staff for Equal Employment Opportunity were unsuccessful in trying to persuade local Plans for Progress contractors on the Gulf Coast to form an organization similar to Huntsville's. (Boeing and North American Aviation were not among these). Al Hodgson NASA Headquarters, Marion Kent from MSFC and myself were invited to attend the meeting. In the afternoon, the group talked to our Executive Committee of the Mississippi Coast Association of Federal Administrators, reviewing recent steps taken to assure EEO. ✓

2. Visitors - Messrs. John Young, Corporate Director, NAA, and Pete Jansen, Special Assistant to the President of Boeing inquired into progress of construction, activation, and possible problems with their respective companies. Messrs. Anderson and Tyler from NASA Headquarters were also here looking into our maintenance picture, congratulating MSFC and MTO Plant Support people for methods and good cost accounting. ✓

3. Call-Type Contracts for Installation, Repair and Alteration to support Activation Task Force near release. - Eleven bids to General Electric are being evaluated for an estimated 450,000 manhours of Davis-Bacon type effort. Each job will be covered by specific work order. Interest is keen among many Aerospace Companies. ✓

4. Additional Funds needed for Tech Systems - to meet increased requirements for FY-65 funds from S-II acceleration. 3.2 million dollars is needed. Diez from NASA Headquarters objected to all of it coming from C of F funds so after legal study we are applying to Saturn V for 1.525 million, R&D portion. ✓

5. Milestones missed - Gulfport cleaning facility being established under GE sub-contract was needed April 1 for cleaning of valves and other cryogenic components. It has still not been certified. GE has action. ✓

NOTES 4/26/65 GEISSLER

B 9/28

1. Presentation on "Extreme Value Statistics": Dr. E. D. Gumbel, Professor of Engineering at Columbia and an international authority on "Extreme Value Statistics," presented a series of three lectures on this subject to twenty participants from AERO, COMP, P&VE and QUAL Laboratories. Based on his April 19 - 20 lectures and discussions, it was concluded that two general classes of statistical problems frequently encountered in aerospace vehicle design are: (1) treatment of multivariate extremes when the statistical variates are correlated, and (2) extreme values in stochastic processes. Dr. Gumbel indicated that solutions to both of these problems are attainable, and will treat them in a future revision to his text on "Extreme Value Statistics." Dr. Gumbel has developed numerous applications in the fields of meteorology, hydrology, fatigue analysis, and aerodynamics, and currently serves as consultant to our Aerospace Environment Office.

Whatever that is B

2. AES Experiments Integration: Latest information from Mr. Taylor indicates that E. Z. Gray is not going to accept our recommendation of breaking the program into manageable pieces but still aims at one single NASA Center to supervise one contractor for all of AES, lunar as well as earth orbit. MSC is seen from Taylor's viewpoint as the Center to do it. They may let 3 competitive parallel contracts thru MSC in the next months to develop the scheme. Mr. de Fries has scheduled a meeting with Mr. Taylor for Monday the 26th, to get full understanding of E. Z. Gray's plan.

3. Alternate Flight Missions: On 4/21/65, R-AERO presented a preliminary Alternate Flight Mission and Contingency Planning proposal to Dr. McCall, who agreed with approach, and pointed out that R-AERO should take lead and develop a final MSFC plan. A memo will be issued requesting support from other R&DO Laboratories. Also this will be discussed with MSC thru Flight Mechanics Panel. Supplementary contractor support manpower may be required. Considerable effort has already been expended in determining the performance advantages for alternate missions with engine out capability in the S-IC and S-II stages. This will be presented to you on May 20, 1965. It is felt that a circumlunar re-entry mission for an early Saturn V flight (502 or 503) would be a very worthwhile project. This could be done unmanned as early as 502 if 501 were a complete success. SA-503 would be more realistic time wise. It was felt that this type of mission would be in accordance with General Phillips' letter requesting suggestions for Spectacular Missions, and it is a reasonable mission to perform.

EG Very interesting B

4. Saturn V/S-IC Heat Shield: Venting analysis on the S-IC tail compartment indicates a pressure differential across the heat shield of 1.0 psi. This number does not include any variations such as variations in leakage area, base pressure coefficient, trajectory, or orifice coefficients. Also, for engine-out conditions, the pressure differential across the heat shield increases by 0.25 psi. The present static design load for the heat shield is 1.0 psi. Therefore, it was recommended that a beef-up of the heat shield be considered. Boeing is in the process of impacting this change on Saturn V schedules.

NOTES 4-26-65 GRAU

B 4/28

1. PEGASUS PROGRAM: Subsystems testing of the Pegasus C is in process at Bladensburg. Power subsystem testing is complete. Communications subsystem testing is scheduled for completion early this week, and Data subsystems testing is expected to be accomplished during the period of May 1 to May 6. ✓

2. S-IVB 201: Inspection squawks against the S-IVB 201 stage have been worked off by DAC and the log books will be presented today, April 26, 1965, for review by Air Force and MSFC personnel. The formal turn-over meeting is scheduled for April 28, and the stage is scheduled for shipment to Sacramento April 30. The component shortage list is still quite high with a significant amount of pre-static operations time at Sacramento scheduled for installation of late delivery items. ✓

3. F-1 ENGINE PROGRAM: Pressure and functional testing of Engine 3011 was completed and the engine released to Manufacturing Engineering Laboratory April 20. Fourteen minor descrepancies were noted. Checkout of engine 3013 was initiated April 20. This is the third engine received for S-1C-1. ✓

NOTES 4/26/65 HAEUSSERMANN

B 4/28

1. SINGLE SUPPORT CONTRACTOR SUPPORT: The original phase-in plan with Sperry (Astrionics Single Support Contractor) calls for complete staffing of both on-site and off-site personnel by 5/1/65. In the critical area of on-site engineering support, Sperry has, as of this date, been successful in employing only 45% of the target goal. Unless the rate of employment increases rapidly, there will be an impact on the laboratory capability to meet schedules. The full impact cannot be ascertained at this time, but will be watched very closely.

The platform ESE for (1) sled test, (2) IB breadboard, and (3) IBM IB checkout (201) is behind schedule. This is attributed mainly to the loss of the Brown support contract. Some of this equipment was being detailed design and some of the panels were being fabricated at Brown. When Brown's contract was being terminated, the workmanship was inaccurate, low in quality, and no inspection or tests were performed. As a result, excessive time is required to put the panels in working order. Here, a shortage of manpower exists since all Brown in-house employees have left and Sperry has been unable to staff this area. Of a total of 29 R-ASTR-G spaces, Sperry has staffed six (four ex-Brown employees). Our Sperry representative says that of a total of 340 in-house Brown employees at Astrionics only 80 have accepted employment with Sperry. Indications are that this will probably be the total number of Brown people that Sperry will be able to obtain.

Dave Newby FYI B

2. DYNAMIC GUIDANCE SWITCHOVER: Further discussions were held with MSC and MIT personnel at MSFC on 4/22/65 concerning the dynamic guidance switchover investigations. (Reference Notes of 4/19/65, Copy Attached*) A preliminary development plan was generated prior to and during the meeting. The plan calls for maximum possible utilization of MSC/MIT personnel and facilities in the development of the flight programs. Some all-digital simulation and final-verification simulation with flight-type hardware will be conducted at MSFC with MSC/MIT or associated contractor support. It was agreed that an MIT flight-type computer and associated equipment (no stabilized platform) would be required at MSFC for program development and system verification. The availability of this equipment appears to be the pacing item, making full development and verification of the back-up capability by SA-503 doubtful although that goal will be retained for planning purposes.

3. REVIEW OF APOLLO INERTIAL COMPONENTS: MSC invited personnel from other government installations to serve on review teams for Apollo/LEM guidance systems and hardware. Astrionics personnel (Messrs. T. Morgan and F. Weber) served on the team which evaluated inertial components (25-IRIG gyro and 16-PIPA accelerometer). During the week of 3/30, the following presentations were made to this team: (1) Sperry - accelerometer, (2) AC Sparkplug - gyros, (3) MIT - development and technical supervision. Our representatives made the following observations: (1) Programs and contracts are supervised by line organization. (2) Program is rich with hardware (stabilizer system - 22 for Apollo, 22 for LEM, 4 flight spare, 12 ground test, 6 ground test spare - Total of 66; gyros and accelerometers - 290 each and 10 each made by MIT). (3) Program has a number of technical problems (performance changes as function of time, startups, environment; pulse integrating pendulous accelerometer (PIPA) and gyro flywheel have design problems, etc.). (4) Program has low yields at acceptance tests (gyros have 26% yield; accelerometers 60%). In some cases NASA requirements for configuration management, Apollo test requirements, reliability requirements, etc. are not applied or only to a limited extent.

4. REPORT ON MR. COOPER'S (IBM/OWEGO) VISIT TO HUNTSVILLE, 4/20/65: A thorough technical and program review with Mr. Cooper was held on Tuesday, 4/20. A detailed report will be our next weekly notes.

* Copy to DIR and R-DIR only.

NOTES 4/26/65 HEIMBURG

B 4/24

1. S-IC

The S-IC-T fuel tank was entered on 4/22, for inspecting the fuel exclusion riser. The bonding between the riser and lower bulkhead appeared to be in good condition. Engines F-2005 and F-2010, stage engine positions 1 & 4, respectively, were removed for changing out the lox pump seal. Initiated the removal of the lox and fuel prevalves for installation of flowmeters.

2. S-IVB TEST STAND (MSFC)

Engine 2006 was installed on the S-IVB battleship, 4/22. This engine will be used only for installation and mockup purposes.

3. S-IVB - DAC, SACTO

Battleship - A cold gimbal program was conducted successfully on 4/22. Approximately 10 hours after the test, an actuator attach bolt failed, probably due to yield. A hot firing is planned for 4/27/65.

Facilities Vehicle - The first propellant loading of a flight weight S-IVB vehicle was successfully performed on 4/21. The launch site loading rate was not simulated on this first loading which was in the manual mode.

4. S-II BATTLESHIP

A dry sequence test was performed on 4/19, and a lox loading and chamber chill completed on 4/20, a.m.

A second chamber chill was planned concurrent with LH_2 loading on 4/23. This has been delayed due to failure of an engine control package on 4/21. An ignition test was performed late Saturday night, 4/24. Preliminary results look OK.

5. MARINE TRANSPORTATION

Construction of all marine equipment is on or ahead of schedule, i.e., MTF barge Pearl River, MTF barge Little Lake, MTF tug, S-IC barge, and KSC barge.

NOTES 4-26-65 HOELZER

B 4/28

Negative Report

NOTES 4/26/65 JAMES B 4/28

S-IB STAGE SPIDER BEAM: The test spider beam failed again during structural testing. Four cross members cracked in the same area and in the same manner as the recent failure on the spider beam of the S-IB-DF vehicle. Reanalysis of the spider beam design, the test fixture and the test procedure is underway. This failure occurred at approximately 110% of design load.

S-IVB: Development and qualification tests have been completed on about 1/3 of the items to be tested. This test schedule is lagging somewhat from the original plan, however all tests constraining the facility checkout stage have been completed. The next loading of this stage is scheduled for April 30. The S-IVB battleship firing series for the S-IB program is projected for completion by mid-May. A full duration test with 1/4 degree gimbling for approximately 70 sec. during the latter part of the test is scheduled for April 27.

LAUNCH CONTROL COMPUTER PROGRAMMING STATUS: The impact of late breadboard ESE deliveries is being evaluated. At this time it appears that in order to meet the current schedule for 201 launch, we may have to eliminate some of those programs categorized as desirable for SA-201. It is felt that a decision must be made about June 1 as to the elimination of some testing of the launch control computer programs.

I. U. ASSESSMENT TEAM: At the second I. U. Monthly Review, April 21, the I. U. checkout station was the primary subject of discussion. A major result of this meeting was the establishment of an assessment team with responsibility for the complete activation of the checkout station at the earliest possible date. Dr. Rees and Mr. Weidner indicated during the meeting that this team would receive their full support. This team is patterned somewhat after the ESE Assessment Team activities.

SPACECRAFT AIR FRAME (SA-201) DEVELOPMENT ENGINEERING INSPECTION: (MRAZEK) Reference my note, 4/19/65, attached. We had representation from this office at this inspection held at NAA on April 20-22. Joe Shea stated the probability of the spacecraft being ready for launch in 1965 is greater than 50%. Significant items evolving from this meeting include the fact that the ground wind capability at launch for 201 is 90% rather than 95%. Since we plan wind restrictions for 201, no problems are anticipated. The spacecraft will require a yaw maneuver in addition to pitch maneuver at S-IVB separation; S-IVB is capable of accomplishing this. Changes in SM I_{sp} and thrust will require revision in the referenced trajectory.

EDS QUALIFICATION AND RELIABILITY TEST PROGRAMS: A meeting has been scheduled with Dr. Kuettner and R&DO personnel to discuss status of these programs. Testing is not being performed on schedule on EDS components because MSFC has not been able to furnish the necessary hardware to CCSD. We plan to discuss possible alternative course of action to insure qualified hardware prior to 201 flight.

PROPOSED MSF FLIGHT MISSION DIRECTIVE: Reference my 4/19/65 note attached. We have discussed the restrictive nature of this directive with personnel at Headquarters and if the results of our agreements via telephone are reflected in the Headquarter's document to be signed by Gen. Phillips, we no longer feel that this matter is a problem.

Attachment: Notes 4/19/65 James

NOTES 4-26-65 Koelle

HHK
We discussed this with FEM and I found him interested. Suggest you prepare a suggested action plan for discussion next MSF Managm. Exec. meeting
B 4/28

1. CATCH EXPLORER I: I understand that Explorer I is still being skin tracked by Goddard and presently has a period of 104 minutes. This should provide one or two years or more lifetime. It occurred to me, that it might be possible to catch Explorer I before it reenters the atmosphere by one of our Gemini or early orbital Apollo flights. This mission might be assigned to one of these flights as an experiment through Dr. Mueller's Experiment Review Board. If such a mission is successful, it has the following benefits:

a. It demonstrates a satellite recovery and repair capability,

b. It preserves a historical piece of space hardware from destruction,

c. After some 8 years in space, the status of the surface should be of great interest to the material researcher,

d. The mission has a high national and international prestige value.

If you think that this idea makes sense, I suggest that you mention it to Dr. Mueller sometime.

2. CENTER SELECTION CRITERIA: Our second iteration on the development of suitable project selection criteria resulted in the following weighted priority list. This was obtained by polling the 45 members of the Executive Board and the Center Planning Working Group, of which 39 elected to participate. We are very happy to have this high degree of cooperation.

	Weight in Percent
1. MSFC chances of accomplishing the project successfully, if we get it	10.43
2. Suitable timing of workload	10.21
3. Availability of skills	9.78
4. Project contribution to long term Center stability	9.66
5. Opportunity to develop new technology	9.32
6. Chances of sustained public support	9.04
7. General appeal of project to Center	8.99
8. Chances of obtaining assignment for MSFC	8.35
9. Does project success depend on MSFC participation	8.23
10. Availability of facilities	8.17
11. Does this project make us a "rich" Center	7.82
	100.00%

I never knew we had so many idealists around here!

Or are we just snobs who take our having money for granted? B

NOTES 4-26-65 KUERS

B 4/28

1. Status and Problems on S-IC-501:

a. The situation on the systems installation in the Thrust Structure has slightly improved, i.e. instead of standing entirely idle we have now sufficient documentation and CAM modified parts that we can keep a small crew busy for 8 hours per day. ✓

Fred
Cline
Any comment?
B

b. The Pressure Volume Compensator (PVC) problem, already reported in recent NOTES, is becoming more serious every day. More qualification test failures have occurred with Arrowhead-built PVC's as well as those built by Flexonics. In order to improve welding techniques, we have reviewed their welding procedures in detail and have also provided for consultation service by The Ryan Company to Arrowhead. We are investigating the micro-crack tendency of Inconel 718 welds with respect to (1) volume of weld metal (determines number of passes), (2) grain size of Inconel, and (3) weld heat input.

c. The total number of Engineering Change Orders received as of April 16 for the S-IC stage is 65,665. The following breakdown gives an indication of change categories:

CAM Generated EO's	19338
Other Stage Hardware Changes	24372
GSE Changes	12379
Paper Changes (no affect on hardware)	9330
MSFC Issued EO's	246
Total	65665

d. The Forward Skirt, Inter Tank Section, and Forward Handling Ring for 501 were shipped April 15 by barge. ✓

2. Accident with Shipment of Explosives for S-I-8: An explosives truck transporting retro-rockets, ullage rockets, and solid propellant gas generators for SA-8 was involved in a highway accident shortly after leaving Huntsville on Saturday, April 17. No explosion occurred; however, the containers were badly damaged. A new shipment of retro-rockets was initiated Sunday morning, April 18. The remaining replacement components were shipped April 22, 1965. ✓

NOTES 4/26/65 MAUS

B 4/28

1. APOLLO COST STUDY - In answer to your question on my 4/12/65 NOTES (copy attached), I do not feel a letter to Dr. Mueller would help under present circumstances.

   At the outset, Dr. Mueller and his staff opposed the study but they were overruled, and were unable to prevent its being done on a crash basis. We have stated our objections to the Apollo Cost Study Team - hopefully, to discourage future exercises of this nature where the urgency is unrealistic and the planning inadequate.

2. DISTRIBUTION OF CONGRESSIONAL MATERIALS - NASA Headquarters notified us last week that Mr. Webb desires that wide distribution be made of portions of Congressional testimony for FY 66 that will help to explain the NASA story to the public. Mr. Webb requested suggestions from key NASA officials, including yourself. We forwarded a reply to Capt. Freitag suggesting that those portions dealing with future programs be distributed to the deans of the country's prestigious colleges and universities.

3. ORGANIZATION AND STAFFING - A new procedure has been established for submission of organization and charter proposals to you for approval. In the future, we will not submit these changes to you until they contain a staffing plan which has been approved by the Personnel Office. The staffing plan will show organization pattern, grade structure contemplated, and number of personnel required.

4. INCENTIVE CONTRACTING - The desirability has been established for a Center meeting to discuss Incentive Contracting policy and procedures, including:
   - Dr. Mueller's philosophy on work packages and use of R&DO sub-system managers,
   - regulations involved,
   - use of data from contractor survey techniques (such as the S-II and S-IC Review)
   - progress report by Stage Managers,
   - required changes in contract language,
   - firming up schedules for conversion of prime contracts to incentive types.

   We will take this up with Ed O'Connor and others involved regarding a meeting date and other necessary arrangements.

NOTES 4-26-65 McCARTNEY

B 9/28

1. FY-65 BUDGET: The laboratories made an overwhelming response to the Center policy of submitting procurement actions by the end of March. A fine spirit of cooperation among Financial Management Office, Purchasing Office, IO and R&D Operations has allowed maximum flexibility and expeditious processing of our last-minute emergency actions. As a result of work during the year by all concerned, a reasonable estimate is that we are two or three months ahead of our position last year.

2. FY-66 CAPITAL EQUIPMENT: In the recent internal R&D Operations guidelines for submittal of requirements to support POP 65-2, R-DIR asked the laboratories to identify separately their capital equipment requirements for FY-66. Projected requirements by laboratory, within overall dollar guidance, are as follows:

ME	850,000
QUAL	3,468,000
RP	160,000
TEST	5,438,000
ASTR	3,817,000
P&VE	2,981,000
COMP	1,908,000
TOTAL	19,085,000

Equipment lists will be reviewed to determine amount for replacement, indications of capability build-up in specific areas, total amounts projected against vehicle or SRT requirements, and to establish an R&D Operations position.

3. R&D OPERATIONS TRAILER ELIMINATION: Investigations of trailer usage in R&D Operations have been completed. A report has been prepared showing location of all trailers, the number of personnel housed, and proposed plans for eliminating the use of trailers. A memorandum outlining these proposed actions will be forwarded to DEP-A within the next few days. On approval by Center Management, actions to implement the plan will get underway.

NOTES 4/26/65 RUDOLPH B 9/28

1. Saturn V Systems Engineering and Integration Support Contract (SE&IS) - I met with 17 contractors of the Saturn V "family" on Thursday, April 22, 1965, to orient the group on Boeing's role in the Saturn V "Systems Engineering and Integration Support" and in the "Launch Vehicle GSE." In addition to the stage contractors (Boeing, S&ID/NAA, DAC, and IBM) the group included Rocketdyne and 12 GSE contractors (e.g. Greer Hydraulics, RCA, GE, Sanders Associates, etc.). My personal impression is that the meeting was extremely successful in explaining Boeing's role in Saturn V and was well received by all contractors. At the conclusion, each contractor expressed his views regarding the project/contractor relation and all positions were objective and cooperative. Seven of the "smaller" contractors had not previously visited MSFC laboratory activities and were provided a brief trip in the afternoon to the S-IC Test Stand, P&VE Structural Testing, and ME Fabrication and Assembly Shop. All expressed extreme interest and enthusiasm in their small, but important, role and seemed rededicated to insure that their commodity meets qualification, schedule, and integration requirements. I expect to complete this orientation on Boeing's role in Saturn V during the next four weeks through visits by Mr. Strickland (Saturn V Project Manager for Boeing Systems Engineering and Integration Support effort) and Key Boeing Personnel to the contractors' plants for more detailed discussions. I also expect to meet from time to time with the Saturn V industrial "family" to discuss appropriate subjects.

2. S-II Battleship Stage Ignition Firing - A successful five engine ignition test was accomplished on the S-II Battleship Stage at approximately 7:00 pm, on Saturday, April 24, 1965. It is planned to accomplish a five engine transition test within one week and first main stage cluster firing within two weeks.

NOTES-4-26-65-SHEPHERD

B 9/28

Canoga Park and Santa Susana. Headquarters United States Air Force is attempting to divest itself of those Industrial Properties which are not primarily engaged in Air Force missions. Air Force Plants 56 and 57 (Canoga Park and Santa Susana) are in this category. North American Aviation has been asked to make purchase offers on these properties. NAA has submitted a bid of 2.75M for the land and buildings at Canoga Park but has declined to make an offer for Santa Susana property or for the Production Equipment at Canoga Park. At an April 23 conference in Headquarters on this subject it was agreed to recommend that the Air Force decline the NAA offer for the land and buildings at Canoga Park, and to request that Air Force retain cognizance of the two plants continuing to provide Air Force Plant Representative Office services. I expect the Air Force will decline the contractor's proposal as being too low a price, and Air Force will look to NASA to take title to the Government property. The compromise position would be to transfer title to NASA but continue Air Force Plant Representative Office services under Defense Contractor Administrative Service Region.

NOTES 4-26-65 Stuhlinger

B 4/28

1. PEGASUS A 1.5 MIL DETECTORS: Irregular behavior (a burst of pulses of 1.5 mil panels)was reported last week. Surprisingly, the panels have been behaving properly since that one irregularity; all of them are presently in normal operation. Careful analysis will permit us to eliminate the obviously spurious pulses. ✓

2. RADIATION PROBLEM ON PEGASUS A: Examination of the Pegasus A electron spectrometer data and of the laboratory tests indicate that we need not assume any radiation problem for Pegasus A. This does not necessarily mean that the same will be true for the Cis-lunar Pegasus which will pass regularly through the Van Allen belt peaks. ✓

3. FLIGHT READINESS REVIEW FOR PEGASUS B: This meeting with OART, FHC, SAT I/IB, Project Office and Evaluation group at KSC last week resulted in a conditional acceptance of Pegasus B for launch. Final acceptance is expected by April 28. From the Evaluation group's standpoint, checkout has been very satisfactory. ✓

4. ART/SRT PROGRAM STATUS: About $16 M contract funds out of about $39 M total authorized ART/SRT funds for FY 65 are now obligated. If Purchasing can maintain the rate of obligation of the past week for eight more weeks, we have a fair chance of obligating our FY 65 program by June 30, 1965. ✓

5. YOUR VISIT TO RPL: We were very appreciative of the time and interest which you devoted to our thermophysics activities during your visit in our Space Environment Laboratory on April 22. This work was started by G. Heller for Explorer I in 1955, and it has been increasing by and around him ever since. At present, his results, his methods, his advice and his help are used by all the NASA Centers, by industries, and by the A.F. Much of his effort has been flowing continuously and directly into our Saturn program. You expressed surprise that you had not heard more of this work; one reason is the fact that the exchange of knowledge has been taking place on the working level, and that no particular problems of management occurred (except the chronic shortage of manpower, which is not a conversation item anyway). We have already got in contact with L. Belew in connection with the J-2 engine problem. ✓ RPL would be very happy to give you similar presentations in four other major areas of this Laboratory's effort: Radiation effect work; Scientific mission studies and scientific support for AES Lunar Surface Exploration; Objectives studies and preliminary project definition of the SAT IB and SAT IB/Centaur payloads; and Results of Pegasus A, and recommendations for further meteoroid satellites.

E.S.

Fine. Let's spread this over 3 or 4 future get-togethers like the one on thermophysics

B